GOVERNMENT COLLEGE OF ENGINEERING AURANGABAD

(An Autonomous Institute of Govt. of Maharashtra)
Station Road, Osmanpura, Aurangabad- 431005 (M.S.)
(0240) 2366101, 2366111, Fax: (0240) 2332835

First Year B. Tech. Curriculum Structure & Detailed Syllabus (UG Program)

(For Civil, Mechanical and Electrical branches)

(Effective from: A.Y. 2021-22)

Vision

In pursuit of global competitiveness, the institute is committed to excel in engineering education and research with concern for environment and society.

Mission

- Provide conducive environment for academic excellence in engineering education.
- Enhance research and development along with promotion to sponsored projects and industrial consultancy.
- Foster development of students by creating awareness for needs of society, sustainable development and human values.

Preamble

The revision of the curriculum tries to incorporate the AICTE guidelines. Curriculum structure has been revised from a total of 176 to 160 credits as per the AICTE recommendations. One semester long internship either at Industry/ Research institute in the VIIIth semester is introduced. A compulsory industrial training of minimum 6 weeks is incorporated during vacation period of second year/third year. Non credit activity based (AB) personality development aspects have been incorporated as a mandatory requirement in the curriculum.

The course categories have been divided into following types:

S. No.	Category	Remarks
1	Humanities and Social Sciences including Management courses	Credit courses
2	Basic Science courses	Credit courses
3	Engineering Science courses including workshop, drawing, basics of Electrical/ Mechanical /Computer etc.	Credit courses
4	Professional core courses	Credit courses
5	Professional Elective courses relevant to chosen specialization/branch	Credit courses
6	Open subjects – Electives from other technical and /or emerging subjects	Credit courses
7	Project work, seminar and internship/training in industry or elsewhere	Credit courses
8	Mandatory Courses (Induction training , Environmental Studies)	Non-credit courses
	Total	160

PROGRAM OUTCOMES

Engineering Graduates will be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Government College of Engineering, Aurangabad

(An Autonomous Institute)

Teaching and Evaluation Scheme from year 2021-22

First Year B. Tech. Program in Civil Engineering

Semester I

Sr. No.	Category	Course Code	Course Name	Teaching Scheme			Credits	Continuous Evaluation in terms of Marks				
				TH	T	PR		ISE I	ISEII	ISEIII	ESE	Total
1	BSC	PHBS1001	Engineering Physics	3	1	-	4	15	15	10	60	100
2	BSC	MABS1001	Engineering Mathematics –I	3	1	-	4	15	15	10	60	100
3	ESC	MEES1001	Engineering Graphics & Design	2	-	-	2	15	15	10	60	100
4	ESC	CEES1001	Basics of Civil Engineering	3	-	-	3	15	15	10	60	100
5	BSC	PHBS1002	Lab-Engineering Physics		-	2	1	25	25		-	50
6	ESC	MEES1002	Lab-Engineering Graphics & Design	-	-	2	1	25	25		-	50
7	ESC	CEES1002	Lab- Basics of Civil Engineering	-	-	2	1	25	25	-	-	50
8	ESC	CEES1003	Lab- Workshop	-	-	4	2	50	50	-	-	100
Total				**11**	**2**	**10**	**18**	**185**	**185**	**40**	**240**	**650**

Induction Program (mandatory)	**3 weeks duration**
Induction program to be completed at the start of the first year.	• Physical activity • Creative Arts • Universal Human Values • Literary • Proficiency Modules • Lectures by Eminent People • Visits to local Areas • Familiarization to Dept./Branch & Innovations

Approved in XXIIIrd Academic Council, Dated 23 June 2021

Semester II

Sr No	Category	Course Code	Course Name	Teaching Scheme			Credits	Continuous Evaluation in terms of Marks				
				TH	T	PR		ISE I	ISEII	ISEIII	ESE	Total
1	BSC	CHBS1001	Engineering Chemistry	3	-	-	3	15	15	10	60	100
2	BSC	MABS1002	Engineering Mathematics –II	3	1	-	4	15	15	10	60	100
3	ESC	CEES1004	Engineering Mechanics	3	-	-	3	15	15	10	60	100
4	ESC	#	BME/EEE/BEE/ BCOMP & IT	3	-	-	3	15	15	10	60	100
5	HSMC	INHS1001	Communication Skill	2	-	-	2	15	15	10	60	100
6	ESC	ETES1003	Engineering Exploration		-	4	2	25	25	25	25	100
7	BSC	CHBS1002	Lab-Engineering Chemistry	-	-	2	1	25	25	-	-	50
8	ESC	CEES1005	Lab-Engineering Mechanics	-	-	2	1	25	25	-	-	50
9	ESC	#	Lab- BME/EEE/BEE/ BCOMP & IT	-	-	2	1	25	25	-	-	50
10	HSMC	INHS1002	Lab- Communication Skill	-	-	2	1	25	25	-	-	50
Total				**14**	**1**	**12**	**21**	**200**	**200**	**75**	**325**	**800**

#			
MEES1003	Basics of Mechanical Engineering (BME)	MEES1004	Lab-Basics of Mechanical Engineering
EEES1004	Elements of Electrical Engineering (EEE)	EEES1005	Lab- Elements of Electrical Engineering
ETES1001	Basics of Electronics Engineering (BEE)	ETES1002	Lab-Basics of Electronics Engineering
CSES1001	Basics of Computer & IT	CSES1002	Lab-Basics of Computer & IT

ACTIVITY BASED PERSONALITY DEVELOPMENT

These are non-credit mandatory activities; a student should engage himself/ herself for his /her personality development. A student shall complete at least two activities (with at least one from each group listed below), before the end of seventh semester.

Activity 1: Co-curricular activities ,which includes but not limited to activities like organizing and/or participating in activities of student chapters and association, paper presentation ,Lab development, participation in national level competitions like Hackathon, BAJA, ROBOCON, etc.

Approved in XXIIIrd Academic Council, Dated 23 June 2021

Activity 2: Extracurricular and outreach activities this includes but not limited to activities like NCC, NSS, social work, health care services, activities of association, participation and/or organizing cultural and sports activities, activities of various clubs, etc.

The student is encouraged to participate in as many activities as possible. However he/ she will choose two activities (one from each group) to be presented before the committee formed by the concerned HOD at the end of seventh semester. The HOD will provide the list of student who has completed the activities satisfactorily to the examination section for inclusion in the grade card of seventh semester.

HCED

Approved in XXIIIrd Academic Council, Dated 23 June 2021

Government College of Engineering, Aurangabad

(An Autonomous Institute)

Teaching and Evaluation Scheme from year 2021-22

First Year B. Tech. Program in Mechanical Engineering

Semester I

Sr. No	Category	Course Code	Course Name	Teaching Scheme			Credits	Continuous Evaluation in terms of Marks				
				TH	T	PR		ISE I	ISEII	ISEIII	ESE	Total
1	BSC	PHBS1001	Engineering Physics	3	1	-	4	15	15	10	60	100
2	BSC	MABS1001	Mathematics –I	3	1	-	4	15	15	10	60	100
3	ESC	MEES1001	Engineering Graphics & Design	2	-	-	2	15	15	10	60	100
4	ESC	MEES1003	Basics of Mechanical Engineering	3	-	-	3	15	15	10	60	100
5	BSC	PHBS1002	Lab- Engineering Physics		-	2	1	25	25	-	-	50
6	ESC	MEES1002	Lab- Engineering Graphics & Design	-	-	2	1	25	25		-	50
7	ESC	MEES1004	Lab- Basics of Mechanical Engineering	-	-	2	1	25	25	-	-	50
8	ESC	MEES1005	Lab- Workshop Practice- I	-	-	4	2	30	30	40	-	100
Total				**11**	**2**	**10**	**18**	**165**	**165**	**80**	**240**	**650**

Induction Program (mandatory)	**3 weeks duration**
Induction program to be completed at the start of the first year.	• Physical activity • Creative Arts • Universal Human Values • Literary • Proficiency Modules • Lectures by Eminent People • Visits to local Areas • Familiarization to Dept./Branch & Innovations

Semester II

Sr No	Category	Course Code	Course Name	Teaching Scheme			Credits	Continuous Evaluation in terms of Marks				
				TH	T	PR		ISE I	ISEII	ISEIII	ESE	Total
1	BSC	CHBS1001	Engineering Chemistry	3	-	-	3	15	15	10	60	100
2	BSC	MABS1002	Mathematics –II	3	1	-	4	15	15	10	60	100
3	ESC	CEES1004	Engineering Mechanics	3	-	-	3	15	15	10	60	100
4	ESC	#	BCE/EEE/BEE/ BCOMP & IT	3	-	-	3	15	15	10	60	100
5	HSMC	INHS1001	Communication Skill	2	-	-	2	15	15	10	60	100
6	ESC	ETES1003	Engineering Exploration		-	4	2	25	25	25	25	100
7	BSC	CHBS1002	Lab-Engineering Chemistry	-	-	2	1	25	25	-	-	50
8	ESC	CEES1005	Lab-Engineering Mechanics	-	-	2	1	25	25	-	-	50
9	ESC	#	Lab- BCE/EEE/BEE/ BCOMP & IT	-	-	2	1	25	25	-	-	50
10	HSMC	INHS1002	Lab- Communication Skill	-	-	2	1	25	25	-	-	50
Total				**14**	**1**	**12**	**21**	**200**	**200**	**75**	**325**	**800**

#			
CEES1001	Basics of Civil Engineering	CEES1002	Lab- Basics of Civil Engineering
EEES1004	Elements of Electrical Engineering (EEE)	EEES1005	Lab- Elements of Electrical Engineering
ETES1001	Basics of Electronics Engineering (BEE)	ETES1002	Lab-Basics of Electronics Engineering
CSES1001	Basics of Computer & IT	CSES1002	Lab-Basics of Computer & IT

ACTIVITY BASED PERSONALITY DEVLOPMENT

These are non-credit mandatory activities; a student should engage himself/ herself for his /her personality development. A student shall complete at least two activities (with at least one from each group listed below), before the end of seventh semester.

Activity 1: Co-curricular activities ,which includes but not limited to activities like organizing and/or participating in activities of student chapters and association, paper presentation ,Lab development, participation in national level competitions like Hackathon, BAJA, ROBOCON, etc.

Activity 2: Extracurricular and outreach activities this includes but not limited to activities like NCC, NSS, social work, health care services, activities of association, participation and/or organizing cultural and sports activities, activities of various clubs, etc.

The student is encouraged to participate in as many activities as possible. However he/ she will choose two activities (one from each group) to be presented before the committee formed by the concerned HOD at the end of seventh semester. The HOD will provide the list of student who has completed the activities satisfactorily to the examination section for inclusion in the grade card of seventh semester.

Government College of Engineering, Aurangabad

(An Autonomous Institute)

Teaching and Evaluation Scheme from year 2021-22

First Year B. Tech. Program in Electrical Engineering

Semester I

Sr. No.	Category	Course Code	Course Name	Teaching Scheme			Credits	Continuous Evaluation in terms of Marks				
				TH	T	PR		ISE I	ISEII	ISEIII	ESE	Total
1	BSC	PHBS1001	Engineering Physics	3	1	-	4	15	15	10	60	100
2	BSC	MABS1001	Engineering Mathematics –I	3	1	-	4	15	15	10	60	100
3	ESC	MEES1001	Engineering Graphics & Design	2	-	-	2	15	15	10	60	100
4	ESC	EEES1001	Fundamentals of Electrical Engineering	3	-	-	3	15	15	10	60	100
5	BSC	PHBS1002	Lab-Engineering Physics		-	2	1	25	25	-	-	50
6	ESC	MEES1002	Lab-Engineering Graphics & Design	-	-	2	1	25	25		-	50
7	ESC	EEES1002	Lab- Fundamentals of Electrical Engineering	-	-	2	1	25	25	-	-	50
8	ESC	EEES1003	Lab- Electrical Workshop	-	-	4	2	50	50	-	-	100
Total				**11**	**2**	**10**	**18**	**185**	**185**	**40**	**240**	**650**

Induction Program (mandatory)	**3 weeks duration**
Induction program to be completed at the start of the first year.	• Physical activity • Creative Arts • Universal Human Values • Literary • Proficiency Modules • Lectures by Eminent People • Visits to local Areas • Familiarization to Dept./Branch & Innovations

SPG

Approved in XXIIIrd Academic Council, Dated 23 June 2021

Semester II

Sr No	Category	Course Code	Course Name	Teaching Scheme			Credits	Continuous Evaluation in terms of Marks				
				TH	T	PR		ISE I	ISEII	ISEIII	ESE	Total
1	BSC	CHBS1001	Engineering Chemistry	3	-	-	3	15	15	10	60	100
2	BSC	MABS1002	Engineering Mathematics –II	3	1	-	4	15	15	10	60	100
3	ESC	CEES1004	Engineering Mechanics	3	-	-	3	15	15	10	60	100
4	ESC	CSES1001	BCOMP & IT	3	-	-	3	15	15	10	60	100
5	HSMC	INHS1001	Communication Skill	2	-	-	2	15	15	10	60	100
6	ESC	ETES1003	Engineering Exploration		-	4	2	25	25	25	25	100
7	BSC	CHBS1002	Lab-Engineering Chemistry	-	-	2	1	25	25	-	-	50
8	ESC	CEES1005	Lab-Engineering Mechanics	-	-	2	1	25	25	-	-	50
9	ESC	CSES1002	Lab- BCOMP & IT	-	-	2	1	25	25	-	-	50
10	HSMC	INHS1002	Lab-Communication Skill	-	-	2	1	25	25	-	-	50
Total				**14**	**1**	**12**	**21**	**200**	**200**	**75**	**325**	**800**

ACTIVITY BASED PERSONALITY DEVELOPMENT

These are non-credit mandatory activities; a student should engage himself/ herself for his /her personality development. A student shall complete at least two activities (with at least one from each group listed below), before the end of seventh semester.

Activity 1: Co-curricular activities ,which includes but not limited to activities like organizing and/or participating in activities of student chapters and association, paper presentation ,Lab development, participation in national level competitions like Hackathon, BAJA, ROBOCON, etc.

Activity 2: Extracurricular and outreach activities this includes but not limited to activities like NCC, NSS, social work, health care services, activities of association, participation and/or organizing cultural and sports activities, activities of various clubs, etc.

The student is encouraged to participate in as many activities as possible. However he/ she will choose two activities (one from each group) to be presented before the committee formed by the concerned HOD at the end of seventh semester. The HOD will provide the list of student who has completed the activities satisfactorily to the examination section for inclusion in the grade card of seventh semester.

PHBS1001: Engineering Physics		
Teaching Scheme	**Examination Scheme**	
Lectures: 03 hrs/ week	**ISE I**	**15 Marks**
Tutorial: 01 hrs/ week	**ISE II**	**15 Marks**
Credits: 04	**ISE III**	**10 Marks**
	End Semester Examination	**60 Marks**

Prerequisites: Nil

Course description: The course is mandatory course for first year B.Tech. Civil, Mechanical and Electrical Engineering programs in first semester. The course objective is to teach fundamental principles in Physics and relate the understanding to applications.

Course Outcomes:
After completing the course, students will able to:

	Course Outcomes
CO1	Define damped harmonic motion, forced oscillations, thin film interference, Fraunhofer diffraction, polarization by double refraction; state features of magnetic and dielectric materials, acoustical demands of building, methods of production of ultrasonics, types of energy bands
CO2	Explain the concepts of oscillations, phenomenon of interference, diffraction, polarization, dielectric and magnetic properties, semiconductors, architectural acoustics and ultrasonics
CO3	Illustrate the engineering applications of oscillations, interference, diffraction, polarization, dielectric and magnetic properties, semiconductors and ultrasonics
CO4	Identify, formulate and solve physical problems related to engineering
CO5	Apply the fundamental principles of oscillations, interference, diffraction, polarization, dielectric and magnetic properties, semiconductors, architectural acoustic and ultrasonic in engineering context

Detailed Syllabus:

Unit 1	**Oscillations**	6 L+2T
	Harmonic oscillations,damped harmonic motion-Derivation of differential equation and it's solutions,over damped,critically damped and under damped cases;quality factor-expression,forced oscillations-differential equation-derivation of expressions for amplitude and phase of forced oscillations,Transvrese vibrations of stretched string,Amplitude resonance-expression for resonant frequency,Quality factor and sharpness of resonance,L-C-R circuit	
Unit 2	**Electromagnetic waves and wave optics**	9 L+3T
	The wave equation; Plane electromagnetic waves in vacuum, their transverse nature and polarization; Relation between electric and magnetic fields of an electromagnetic wave; energy carried by electromagnetic waves Interference- Interference due to thin films of uniform thickness (with derivation) and wedge shape films (qualitative), Newton's rings, Anti-reflection coating. Diffraction- Fraunhofer diffraction at single slit (geometrical method), Condition for maxima and minima, Double slit Diffraction (qualitative results only), Plane diffraction grating(qualitative), Conditions for maxima and minima, Rayleigh's criterion of resolution, R.P of grating. Polarization-Polarization by double refraction; Quarter wave plate; Half wave plate;	

Approved in XXIIIrd Academic Council, Dated 23 June 2021

	Production of circularly and elliptically polarized light
Unit 3	**Engineering Materials-** 6 L+2T Dielectric properties of material- Dielectric constant, Induced and Permanent dipoles, Polar and Non-Polar dielectrics, Polarization of dielectric materials, Types of polarization, Ferro and Piezo-electricity(qualitative),Frequency dependence of dielectric constant, Applications of dielectric materials. Magnetic properties of materials-Review of basic formulae, Magnetic susceptibility, Classification of dia, para and ferromagnetic materials, Ferromagnetic domains, Hysteresis in ferromagnetic materials, Soft and Hard magnetic materials, Applications.
Unit 4	**Semiconductors** 6 L+2T Band theory of Solids, Classification of solids on the basis of energy band theory, Fermi-Dirac statistics, Concept of Fermi level and its variation with temperature and impurity, Density of states(qualitative),Position of Fermi level in intrinsic semiconductor(with derivation) and in extrinsic semiconductor(qualitative),Conductivity of semiconductor, Working of p-n junction from energy band diagram,Hall effect in semiconductor(with derivation).
Unit 5	**Acoustics and Ultrasonics** 6 L+2T Acoustics- Classification of sound; musical sound; noise, characterstics of musical sounds-Pitch, loudness or intensity, measurement of intensity level, Decibel, quality or timbre, Reflection of sound, Echo, Reverberation, Reverberation time, Absorption of sound, Absorption coefficient, Sabine's formula(qualitative), Eyring's equation, Factors affecting architectural acoustics, Ultrasonics-Production of ultrasound by piezo-electric and magneto-striction oscillator, Engineering applications of ultrasound-non destructive testing.

Text and Reference Books

1. H. K. Malik,A.K.,and Singh, *Engineering Physics,* 2nd ed New Delhi:Tata McGraw Hill, 2017
2. M. N. Avadhanulu, and P.G.Kshirsagar. *A Textbook Of Engineering Physisc*, 5th ed. New Delhi: S.Chand and company Ltd.,2014
3. R. K. Gaur,S.L.Gupta. *Engineering Physics*, 14th ed. New Delhi: Dhanpat Rai and Sons Publications, 2012
4. M. R. Srinivasan, *Physics For Engineers*, 2nd ed.New Delhi:New Age International Publishers,2009.
5. A. Ghatak, *Optics*, 4th ed.New Delhi: Tata-McGraw Hill Publications,2008
6. F.A.Jenkins, and H.E.White. *Fundamentals Of Optics*, 4th ed. Noida: Mc Graw Hill Publication,2011
7. G.K.Grover,and S.P.Nigam. *Mechanical Vibrations*, 3rd ed. Roorkee: Nem Chand and Bros.,2018
8. H.J.Pain. *The Physics of Vibrations and Waves*, Noida: John-Wiley and Sons, 2005
9. I.G.Main. *Oscillations and Waves in Physics*, 3rd ed. New Delhi: Cambridge University Press,1993
10. D.Halliday,and R.Resnic. *Fundamentals of Physics*, 9th ed.Noida:, John –Wiley and Sons, 2010

Approved in XXIIIrd Academic Council, Dated 23 June 2021

Mapping of Course outcomes with Program outcomes:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2											
CO2	2											
CO3	2									1		
CO4	3	2	1									
CO5	3	1										

1-Low, 2-Medium, 3-High

Approved in XXIIIrd Academic Council, Dated 23 June 2021

MABS1001 : ENGINEERING MATHEMATICS I		
Teaching Scheme	**Examination Scheme**	
Lectures: 03 hrs/ week	**ISE I**	**15 Marks**
Tutorial: 01 hrs/ week	**ISE II**	**15 Marks**
Credits: 04	**ISE III**	**10 Marks**
	End Semester Examination	**60 Marks**

Prerequisites: Nil

Course Description:
Engineering Mathematics I is a compulsory course for all the First Year B.Tech. students of the institute.

Course Outcomes:

After completing the course, students will be able to:

	Course Outcomes	Bloom's Taxonomy Level	Unit
CO1	Define Beta, Gamma and error functions and find the roots of Complex Numbers, Rank of Matrix,limit of function, series expansion and maxima – minima of functions, asymptotes of given curves.	K1	1,2,3,4,5
CO2	Summarise the Complex Numbers; Explain the Rank of Matrix, successive differentiation, Special functions (Beta and Gamma functions)	K2	1,2,3,4,5
CO3	Identify the real and imaginary part of logarithm of complex numbers, eigen values and eigen vectors.	K2	1,2
CO4	Solve the system of linear equations using Gauss elimination and Gauss Jordan Method, Leibnitz's theorem,definite integrals using Beta and Gamma functions and definite integrals using rule of Differentiation under integral sign.	K2	2,3,4
CO5	Apply DeMoivre's theorem, Cayley Hamilton theorem, , knowledge of integral calculus and sketch the approximate shape of the curves .	K3	1,2,4,5

Approved in XXIIIrd Academic Council, Dated 23 June 2021

Detailed Syllabus:

Unit 1	**Complex Numbers** (6L + 2T) Defination of complex numbers, Argand Diagram, De-Moivre's theorem and its application to find roots of algebraic equations, expansions of trigonometric functions, Circular and Hyperbolic functions inverse Hyperbolic functions, Logarithm of complex numbers, separation into real and imaginary parts.
Unit 2	**Matrices** (9L+ 3T) Rank of matrix, rank nulity theorem, echelon form of matrix, normal form of matrix, algebraic system of m linear equations in n unknows, Gauss elimination and Gauss Jordan elimination method, linear dependence and independence of vectors, orthogonal matrix, linear transformations, Eigen values and Eigen vectors, Cayley Hamilton theorem and its applications.
Unit 3	**Differential Calculus** (8L+2T) nth order ordinary derivatives of elementary functions, Leibnitz's theorem, expansion of function in power series, Taylor's series, Maclaurin's series indeterminate forms and L'hospital rule, maxima and minima, converge of sequence and series, range of convergence of power series, test of convergence – ratio test and comparison test.
Unit 4	**Integral Calculus** (7L+3T) Beta function, Gamma function, rules of Differentiation Under Integral Sign, error function, application of definite integrals to evaluate surface area and volume of revolutions.
Unit 5	**Curve Tracing and its applications** (6L+2T) Tracing of cartesian curves, polar curves and parametric equations, rectification of plane curves: cartesian and polar .

Text and Reference Books

1. Ramana B.V. *Higher Engineering Mathematics*, 11th Reprint, New Delhi:Tata McGraw Hill, 2010.
2. Erwin Kreyszing, *Advanced Engineering Mathematics*, 10th ed, Mumbai: Willey Eastern Ltd. 2015.
3. Ravish R. Singh, Mukul Bhatt, *Engineering Mathematics- A tutorial approach*, 4th ed, New Delhi: Tata McGraw Hill Education Pvt. Ltd.2018.
4. Dass H.K., *Advanced Engineering Mathematics*, 22nd ed, New Delhi: S. Chand publications, 2018.
5. P. N. Wartikar and J. N. Wartikar, *A text book of Engineering Mathematics* (Vol. 1 & 2), Reprint, Pune : Pune Vidhyarthi Grihaprakashan, 2013.
6. B. S. Grewal, *Higher Engineering Mathematics*, 44th ed, New Delhi: Khanna publication, 2017.

Approved in XIIIrd Academic Council, Dated 23 June 2021

MEES1001: Engineering Graphics & Design		
Teaching Scheme	**Examination Scheme Theory**	
Lectures: 02 hrs/ week	**ISE I**	**15 Marks**
Credits:02	**ISE II**	**15 Marks**
	ISE III	**10 Marks**
	End Semester Examination	**60 Marks**

Prerequisites: NIL

Course Description: Engineering Graphics & Design is aimed at providing basic understanding of the fundamentals mainly visualization, graphics theory, standards, conventions and soft tools.

Course Outcomes:

After completing the course, students will able to:

	Course Outcomes
CO1	Explain the basic concepts in Engineering Graphics and its applications
CO2	Apply the standard process of drawings for various engineering curves
CO3	Apply the principles of orthographic projections to solve the problems on lines, planes and solids on drawing sheets and by using soft tools
CO4	Describe the orthographic and isometric views in Engineering Graphics
CO5	Apply the principles of the orthographic and isometric views to solve the problems on drawing sheets and by using soft tools

Detailed Syllabus:

Unit 1	**Introduction to Engineering Drawing and Engineering Curves** Principles of Engineering Graphics and their significance, Introduction to Engineering curves like Rectangular Hyperbola (General method only); Cycloid, Epicycloid, Hypocycloid, Involutes and spirals.
Unit 2	**Projections of Points, Lines and Planes** Principles of Orthographic Projections-Conventions - Projections of Points and lines inclined to both planes; Projections of planes, inclined to both planes.
Unit 3	**Projections of Regular Solids** Introduction to Solids: Prisms, Pyramid, Cylinder, Cone, Cube, Tetrahedron, Projections of above Solids with Axis inclined to one plane, Projections of above solids with Axis inclined to both the Planes
Unit 4	**Orthographic Projections** Orthographic views of different Machine parts, Sectional orthographic views of various Machine parts,
Unit 5	**Isometric Views and Projections** Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions.

Approved in XXIIIrd Academic Council, Dated 23 June 2021

PHBS1002: Lab-Engineering Physics		
Teaching Scheme	**Examination Scheme**	
Practical: 2Hrs/Week	**ISE I**	**25 Marks**
Credits:01	**ISE II**	**25 Marks**

Course Outcomes:

After completion of this course students will be able to:

	Course Outcomes
CO1	Demonstrate basic laws of Physics with experimental process
CO2	Conduct experiments to understand the relationship between variables in physical problems
CO3	Interpret experimental data to examine the physical laws
CO4	Illustrate the relevance between theoretical knowledge and means to imply it in a practical manner by performing various experiments
CO5	Work in teams and understand the effective team dynamics.

List of the Experiments:

The student shall perform minimum Ten experiments of the following:

Sr. No.	Title of the Experiments	Skill / Knowledge Level	CO	Marks for ISE
1	e/m by Thomson's method.	S1/K2	CO3	05
2	Determination of radius of curvature of plano-convex lens by Newton's ring.	S1/K1	CO1	05
3	Determination of the wavelength of light of a given source using diffraction grating.	S1/K2	CO1	05
4	Resolving power of telescope.	S1/K2	CO3	05
5	Study of C.R.O (amplitude and frequency measurement).	S1/K1	CO5	05
6	Specific rotation of sugar solution by Laurent's half shade polarimeter.	S1/K2	CO4	05
7	Determination of band gap of a semiconductor.	S1/K2	CO3	05
8	To study temperature dependence of resistivity of a semiconductor using four probe method.	S1/K2	CO3	05
9	To determine the Hall coefficient of a semiconductor material and then evaluate carrier type and its density of charge carrier.	S1,S3/K2	CO1	05
10	Study of solar cell characteristics.	S1/K1	CO2	05
11	Determination of wavelength of Laser using grating.	S1,S2/K2	CO3	05
12	Determination of velocity of sound through water using	S1,S3/K2	CO3	05

Approved in XXIIIrd Academic Council, Dated 23 June 2021

	ultrasonic interferometer.			
13	To plot the hysteresis loop of a given magnetic material(iron)	S1/K2	CO2	05
14	To study characteristics of photovoltaic cell.	S1/K2	CO3	05
15	Magnetic field along the axis and current carrying coil-Stewart and Gees method	S2,S3/K2	CO1	05
16	Study of divergence of Laser beam.	S2,S3/K2	CO2	05
17	To measure thickness of fine wire and grating element with the help of Laser source.	S1/K2	CO1	05
18	To study charge and discharge of a condenser and hence determine the time constant	S1,S3/K2	CO3	05
19	To study the oscillation of a mass in combination of two springs and hence determination of force constant.	S1/K2	CO3	05
20	Semiconductor diode characteristics (Ge,SI,Zener,LED).	S1/K2	CO1	05
21	Series L-C-R resonance circuit-determination of "Q" factor	S1/K2	CO2	05
22	Time Constant of R-C circuit	S1/k2	CO2	05

Mapping of Course outcomes with Program outcomes:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3			2								
CO2	3			3								
CO3	3	2	1	3								
CO4	3	2	1	2								
CO5									2			

1-Low, 2-Medium, 3-High

Approved in XXIIIrd Academic Council, Dated 23 June 2021

MEES1002: Lab - Engineering Graphics and Design		
Teaching Scheme	**Examination Scheme Semester I (Practical)**	
Practical: 2Hrs/Week	**ISE I**	**25 Marks**
Credits:01	**ISE II**	**25 Marks**

List of the Experiments:

Sr. No.	Title of the Experiments
1.	Introduction to Computer Graphics (CAD) Demonstrating of the theory of CAD software, Standard Toolbars and Basic operations used like, Object Properties, Draw, Modify and Dimension, Select and erase objects etc. in CAD software package
2.	Drawing problems based on various engineering curves on drawing sheet and by using soft tools
3.	Drawing problems based on projections of lines and planes on drawing sheet and by using soft tools
4.	Drawing problems based on projections of solids on drawing sheet and by using soft tools
5.	Drawing two problem each based on sectional orthographic projections and isometric projections on half imperial size drawing sheet
6.	Drawing two problems based on orthographic projections by using software package like AUTOCAD/ CATIA/ UGNX
7.	Drawing two problems based on isometric projections by using software package like AUTOCAD/CATIA/ UGNX

Text and Reference Books

1. Bhatt N.D., Panchal V.M. & Ingle P.R., *Engineering Drawing*, 3rd ed. Charotar Publishing House, 2014.
2. Shah, M.B. & Rana B.C., *Engineering Drawing and Computer Graphics*, 2nd ed. Pearson Education 2008.
3. Agrawal B. & Agrawal, C. M., *Engineering Graphics*, 3rd ed. TMH Publication, 2012.
4. Jensen Cencil, *Engineering Drawing and Design*, 7th ed. TMH Publication, 2014.
5. K Venugopal, Dr. V Prabhu Raja, *Engineering Drawing + Auto Cad*, 1st ed, New Age International 2020.

Approved in XXIIIrd Academic Council, Dated 23 June 2021

Mapping of Course outcome with Program Outcomes and Program Specific Outcomes for Engineering Graphics and Design

Course outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12
CO1	1											
CO2	3	1			1			1		1		1
CO3	3				1			1		1		1
CO4	1	1										
CO5	3	1			1			1		1		1

1-Low, 2-Medium, 3-High

CHBS1001 - Engineering Chemistry		
Teaching Scheme	**Examination Scheme**	
Lectures: 03 Hrs/Week	**ISE I**	**15 Marks**
Credits: 03	**ISE II**	**15 Marks**
	ISE III	**10 Marks**
	End Semester Examination	**60 Marks**

Prerequisites: Nil

Course description:

Engineering Chemistry is a one semester compulsory course for the B. Tech First year Civil, Mechanical and Electrical Engineering students of the institute.

The course is aimed at introducing the fundamentals of engineering chemistry to under graduate students. The goal of the course is to remember, understand and apply basic principles of engineering chemistry and their application in different branches of engineering to solve engineering problems and to support their concurrent and subsequent engineering studies.

Course Outcomes:

After completing the course, students will be able to:

	Course Outcomes
CO1	Explain lubricants as engineered materials based on the mechanism of lubrication, physical state and their properties for use in automobile engines, machineries, equipments and tools.
CO2	Interpret the stereochemistry of organic and inorganic compounds by using concept of isomerism, configuration systems and conformational analysis.
CO3	Recognize the use of polymers based on their structure, types, mechanisms of preparation and properties for domestic and industrial applications.
CO4	Predict the use of water for domestic and industrial applications based on its hardness and estimation and related numerical by EDTA method.
CO5	Explain methods of production and characteristic properties of solid, liquid, gaseous fuels for making advancement in fuel technology.

Detailed Syllabus:

Unit 1	**Lubricants** (7 Hrs) Introduction, Mechanisms of lubrication - Fluid film, Boundary film & Extreme pressure. Types of lubricants – Solid lubricants – Molybdenum disulphide, Graphite. Liquid lubricants – Vegetable, Animal, Mineral & Synthetic oils. Semi solid lubricants – Greases, Lubricating Emulsions – Oil in water, Water in oil. Properties of lubricants & its significance – Physical properties – Viscosity & Viscosity Index. Determination of viscosity by Redwood viscometer, Flash & Fire point by Pensky-Marten's apparatus, Cloud & Pour point. Chemical properties – Acid value, Saponification value, Steam emulsification number.
Unit 2	**Stereochemistry** (8 Hrs) Optical isomerism – optical activity, Chirality, D-L and R-S configuration system, determination of configuration using sequence rules, Optical isomerism in compounds containing one & two asymmetric carbon atom - Lactic acid & Tartaric acid. Conformational analysis – Conformations of cyclohexane – chair & boat Conformation. Conformation of mono & di-substituted cyclohexane.

Approved in XXIIIrd Academic Council, Dated 23 June 2021

Unit 3	**Polymers** (7 Hrs) Introduction, Classification of polymers, Mechanism of addition polymerization by free radical method. Preparation, properties & applications of – Polyethylene, Polystyrene, PVC, Nylon 66, Teflon, Polyester. Vulcanization of rubber by accelerated sulpher method, Synthetic Rubber – preparation, properties & applications of – Styrene butadiene rubber (SBR), Nitrile rubber, Butyl rubber.
Unit 4	**Water Treatment** (7 Hrs) Introduction, Definition of hard and soft water, Sources of water and classification of impurities, Hardness and its types, Units of hardness, Determination of hardness of water by EDTA method, Numerical. Boiler troubles - Scale & Sludge formation in boiler, Internal treatment methods, Priming & Foaming, Caustic Embrittlement. Water softening process – Zeolite process.
Unit 5	**Fuels** (7 Hrs) Definition, Classification of fuels, Calorific value – Gross calorific value, Net calorific value, Different units of Calorific value & their inter-relation, Numerical. Types of fuels – Solid fuel – Coal – Proximate & Ultimate analysis of coal, Determination of calorific value by Bomb calorimeter, Numerical. Liquid fuel – Petroleum – origin, refining & Fractional distillation, Catalytic cracking – Fixed bed and Moving bed type. Gaseous fuel - preparation, properties and applications of – Coal gas, Water gas. Advantages and Disadvantages of solid, liquid and gaseous fuels.

Text and Reference Books

1. Jain & Jain, "*Engineering Chemistry*", 16th ed, Dhanpat Rai Publishing Co.
2. Dr. S S Dara and Dr. S. S. Umare, "*A Text Book of Engineering Chemistry*", S Chand & Co. Ltd.
3. B Sivasankar, "*Engineering Chemistry*", Tata Mc Graw Hill (P) Ltd.
4. Dr. B S Chauhan, "*Engineering Chemistry*", 3rd ed, University Science Press.
5. S K Singh, "*Fundamentals of Engineering Chemistry*", 6th ed, New Age International Private Limited
6. Shashi Chawla, "*A Text book of Engineering Chemistry*", 3rd ed, Dhanpat Rai Publishing Co.
7. P S Kalsi, *Stereochemistry: Conformation and Mechanism,* New Age International Private Limited
8. V R Gowariker, "*Polymer Science*", 3rd ed, New Age International Private Limited
9. T W Graham Soloman, "*Fundamentals of organic chemistry*", 12th ed, John Wiley & Sons Inc.
10. Alberty & Silbey, "*Physical Chemistry*", 5th ed, John Wiley & Sons Inc.
11. Morrison & Boyd, "*Organic Chemistry*", 6th ed, Prentice Hall of India.

Approved in XXIIIrd Academic Council, Dated 23 June 2021

Mapping of Course Outcome with Programme Outcomes

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P 12
CO 1	3	2	2	2		1	1					1
CO 2	3	1	1	1								1
CO 3	3	2	2	2		1	1					1
CO 4	3	2	2	2		1	1					1
CO 5	3	2	2	2		1	1					1

1-Low, 2-Medium, 3-High

Approved in XXIIIrd Academic Council, Dated 23 June 2021

MABS1002 : ENGINEERING MATHEMATICS II		
Teaching Scheme	**Examination Scheme**	
Lectures: 03 hrs/ week	**ISE I**	**15 Marks**
Tutorial: 01 hrs/ week	**ISE II**	**15 Marks**
Credits:04	**ISE III**	**10 Marks**
	End Semester Examination	**60 Marks**

Prerequisite: Engineering Mathematics I

Course description:
Engineering Mathematics II is a compulsory course for all the First Year B.Tech. students of the institute.

Course Outcomes:

After completing the course, students will be able to:

	Course Outcomes	Bloom's Taxonomy Level	Unit
CO1	Define first order first degree ordinary differential equations, orthogonal trajectories; partial derivatives, Jacobian, Directional Derivative, Gradients, Curl and divergence; Multiple integrals; FourierSeries; Three dimensional Coordinate system.	K1	1,2,3,4,5
CO2	Summaries the First order First degree Linear Differential Equations; Partial, Total Derivatives; methods of solving Multiple Integrals; Fourier Series and Half Range Fourier series Expansion; Sphere, cone and Cylinder.	K2	1,2,3,4,5
CO3	Identify Order of Differential Equation and exactness; Homogeneous function, Gradient, Divergence and Curl; Even and odd functions, Euler's coefficients for the Fourier Series; Equations of Sphere, Cone and Cylinder.	K2	1,2,4,5
CO4	Solve the First order Linear Differential Equations, Jacobians, Maxima and Minima of functions of two variables; Double and Triple Integrations;	K2	1,2,3
CO5	Apply knowledge of Differential equation to different Engineering Problems, Partial derivative;Multiple Integrals to find area and volume of solids, Fourier Series to Harmonic Analysis.	K3	1,2,3,4.

Approved in XXIIIrd Academic Council, Dated 23 June 2021

Detailed Syllabus:

Unit 1	**First order ordinary differential equations and its applications** (6L+ 2T) Exact, linear and Bernoulli's equations, application of first order ordinary differential equations: orthogonal trajectories, simple electrical circuit, D'Alembert's principle, one dimensional conduction of heat.
Unit 2	**Multivariate Calculus [Differentiation]** (9L+3T) Limit, continuity, partial derivatives, Euler's theorem on homogeneous functions, implicit functions, composite functions, total derivatives, Jacobians and their applications, error and approximations, maxima and minima of functions of two variables, saddle points, Lagrange's method of undermined multipliers, Directional Derivative, Gradients, Curl and divergence.
Unit 3	**Multiple integrals and its applications** (9L+3T) Double and triple integrals (Cartesian and polar), change of order of integration in double integrals, change of variables (Cartesian to polar), applications: to find area and volume.
Unit 4	**Fourier Series** (6L+2T) Fourier Series (Dirichlet's conditions), Periodic functions, convergence of the Fourier series, Euler's formula, Fourier series expansion with period 2π, 2L,Fourier series of even and odd functions, Half range sine and cosine series, applications to harmonic analysis.
Unit 5	**Solid Geometry** (6L+2T) Cartesian, spherical, and cylindrical coordinate system, Sphere, Cone, Cylinder.

Text and Reference Books

1. Ramana B.V. *Higher Engineering Mathematics*, 11th Reprint,New Delhi:Tata McGraw Hill, 2010.
2. Erwin Kreyszing, *Advanced Engineering Mathematics*, 10th ed,Mumbai: Willey Eastern Ltd.2015.
3. Ravish R. Singh, Mukul Bhatt, *Engineering Mathematics- A tutorial approach*, 4th ed, New Delhi: Tata McGraw Hill Education Pvt. Ltd.2018.
4. Dass H.K. *Advanced Engineering Mathematics*, 22nd ed, New Delhi: S. Chand publications, 2018.
5. P. N. Wartikar and J. N. Wartikar, *A text book of Engineering Mathematics* (Vol. 1 & 2), Reprint, Pune : Pune Vidhyarthi Grihaprakashan, 2013.
6. B. S. Grewal, *Higher Engineering Mathematics*, 44th ed, New Delhi: Khanna publication, 2017.

Approved in XXIIIrd Academic Council, Dated 23 June 2021

Mapping of Course outcome with program outcomes

Course outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	1									1
CO2	2	2	1									1
CO3	2	2	1									1
CO4	2	3	1		2							1
CO5	3	3	1		2							1

1-Low, 2-Medium, 3-High

Approved in XXIIIrd Academic Council, Dated 23 June 2021

CEES1004: ENGINEERING MECHANICS		
Teaching Scheme	**Examination Scheme**	
Lectures: 03 hrs/ week	**ISE I**	**15 Marks**
Credits: 03	**ISE II**	**15 Marks**
	ISE III	**10 Marks**
	End Semester Examination	**60 Marks**

Prerequisites: Knowledge of vectors and scalars and preliminary knowledge of motion.

Course description: Engineering Mechanics is one of the basic subjects for the students of engineering, irrespective of their branches, since it help them to develop the logical thinking, analytical ability and enhance the imagination power. It introduces the students to various types of forces, their resultant, equilibrium of forces, analysis of various force system and the effect of forces on the state of motion of the body. Students will be exposed to C.G. and M.I. of the area and mass M.I of the bodies. They will also be exposed to dynamics of particle and rigid body.

Course Outcomes:

After completing the course, students will be able to:

	Course Outcomes
CO1	State and explain the relevant laws of statics and dynamics.
CO2	Apply the principles of engineering mechanics to determine resultant of forces and to perform static analysis of determinate structures subjected to various force system.
CO3	Determine the centroid and compute moment of inertia of area and centre of gravity and mass moment of inertia of regular bodies.
CO4	Establish relations between kinematic parameters for different types of motion and compute the motion characteristics.
CO5	Apply the principles of kinetics to compute the motion parameters or related forces of a given system.

Detailed Syllabus:

Unit 1	**Fundamental Concepts and Principles** Types of Force systems, Composition and Resolution of Forces, Moment of force, Couple, Resultant of Planar and Spatial force systems, Analytical and Graphical methods.
Unit 2	**Free body diagrams** Equations of Equilibrium, Types of Supports and support reactions, Equilibrium of Co-planer force systems, Applications to beams and frames, Theory and Laws of Friction, Cone of friction, wedge friction, rolling friction, Belt friction and their applications.
Unit 3	**Centroid of Plane figures and lines** Moment of Inertia of plane sections, Transformation theorems, Radius of gyration, Centre of gravity and Mass Moment of Inertia of regular bodies.
Unit 4	**Kinematics of particles** : Rectilinear Motion, Equations of Motion, Motion curves and their applications, Curvilinear motion in Cartesian, Normal and Tangential components, and Polar Co-ordinates, Motion of projectile, Relative motion, Fixed axis rotation.
Unit 5	**Kinetics of particles:** Newton's laws of Motion, D'Alembert's Principle, Equations of motion of particle and

Approved in XXIIIrd Academic Council, Dated 23 June 2021

	rigid body, motion of connected bodies, Fixed axis rotation. Principle of work and Energy, Principle of Impulse and Momentum and their applications to particles, Direct central impact.

Text and Reference Books:

1. Beer and Johnston, *Mechanics for Engineers (Statics and Dynamics)*, 8th ed, McGraw Hill Co.Ltd.
2. A.K.Tayal, *Engineering Mechanics*, 14th ed, Umesh publications.
3. S.S.Bhavikutti and K.G. Rajashekarappa, *Engineering Mechanics*, 8th ed, New Age International (P) Limited Publishers, New Delhi.
4. F.L. Singer, *Engineering Mechanics*, 3rd ed, Harper and Row Publishers, USA
5. Timoshenko and Young, *Engineering Mechanics*, 5th ed, McGraw Hill Co.Ltd.
6. R.C. Hibbeler, *Engineering Mechanics (Statics and Dynamics)*, 14th ed, McMillan publications
7. McLean and Nelson, *Engineering Mechanics*, 17th ed, Schaum's Outline Series, McGraw Hill Co.Ltd. New Delhi

Mapping of Course outcome with Program Outcomes and Program Specific Outcomes

Course Outcomes	PO 1	PO 2	PO 3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
CO1	3	2	1									
CO2	3	3	1									
CO3	3	1	1									
CO4	3	3	2									
CO5	3	3	2									

1-Low, 2-Medium, 3-High

Approved in XXIIIrd Academic Council, Dated 23 June 2021

INHS1001-COMMUNICATION SKILLS		
Teaching Scheme	**Examination Scheme**	
Lectures: 02 hrs/ week	**ISE I**	**15 Marks**
Credits: 2	**ISE II**	**15 Marks**
	ISE III	**10 Marks**
	End Semester Examination	**60 Marks**

Prerequisites: Nil

Course description:

Communication Skills is a one semester compulsory course for the first year students of all disciplines of the institute.

The course is aimed at introducing the basic of the communication skills. The goal of the course is to improve listening, speaking, reading and writing skills .Thus the stress in the syllabus in primarily on the development of communicative skills and fostering of ideas.

Course Outcomes:

After completing the course, students will be able to:

	Course Outcomes
CO1	Analyze the situation and overcome the barriers in speaking English and get the ability to communicate in professional as well as day to day life.
CO2	Develop personality through corporate etiquettes and take active participation in discussion and other academic activities as well.
CO3	Apply proper words and structure in speaking English language and develop vocabulary and use of correct English.
CO4	Express them through oral as well as written communication and develop written communication for professional and business purpose.
CO5	Use of E-Communication in day to day as well as professional life

Detailed Syllabus:

Unit 1	**Communication Skills & Soft Skills** Basic Concept, Factors, Process and Types of Communication, Principles of Effective Communication, Barriers of Communication. And how to overcome these barriers. Basic of Soft skills.	5hrs
Unit 2	**Nonverbal Communication and Corporate Etiquettes** Body Language and its different aspects, Voice Dynamics & Voice Modulation, Professional Appearance, Clothing Etiquettes and Corporate Dressing.	5hrs
Unit 3	Remedial Grammar And Vocabulary Building Parts of Speech, Types of Tense, Use of Articles, Synonyms and Antonyms, Find out the Grammatical Errors in the given sentences.	5hrs
Unit 4	**Writing Skills And Business Correspondence** Letter Writing, Office documents like Circulars, Notices, Minutes, Agenda And Memos Report Writings-Technical report , Academic report, Accident report. Resume Writing	5hrs
Unit 5	**E-Communication** Introduction to Multi-cultural, Global Cultural traits, Email Communication and Email Etiquettes	5hrs

Approved in XXIIIrd Academic Council, Dated 23 June 2021

Text and Reference Books

1. S.M.Rai and Urmila Rai, *Business Communication*, 1st ed, New York, USA, New royal book Company Publication,2010
2. Leena Sen, *Communication skills*, 2nd Revised ed, Publisher-PHI Learning,2007
3. William Sanborn, *Technical communication*, Delhi, Pearson publications ,2014
4. McGraw Hills brief case books, *Presentation Skills for Managers*, United states, John A.Hill,1888
5. Pravil S.R. Bhatia and S.Bhatia, *Professional Communication Skill*, 8th Revised ed, SChand Publications,2001
6. Daniel G. Riordan and Steven E. Pauley, *Technical Report Writing Today*,10th ed, USA, Michael Rosenberg Publisher
7. B. N. Basu 22 of 25, *Technical Writing*, 1st ed, New Delhi, Prentice hall of India,2008
8. M. A Pink and S. E. Thomas., *English Grammar Composition & Effective Business Communication*, 12th ed, S Chand Publication,1998
9. Sarah Freeman, *Written Communication in English*, 1st ed, Orient Blackswan publication,1996

Mapping of course outcome with Program outcomes and program specific outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1						1				3		
CO 2						1				3		
CO 3						1				3		
CO 4									3	3		
CO 5					3					3		1

1-Low, 2-Medium, 3-High

Approved in XXIII[rd] Academic Council, Dated 23 June 2021

ETES1003: Engineering Exploration		
Teaching Scheme	**Examination Scheme**	
Practical: 4 Hrs/Week	**ISE I**	**25 Marks**
Credits:02	**ISE II**	**25 Marks**
	ISE III	**25 Marks**
	End Semester Evaluation	**25 Marks**

Prerequisites: NIL

Course Outcomes:

As an outcome of completing the course, students will be able to:

CO1	Explain the role of an Engineer as a problem solver
CO2	Identify multi-disciplinary approach required in solving an engineering problem
CO3	Build simple mechanisms using engineering design process
CO4	Interface different peripherals to Arduino.
CO5	Apply basics of engineering project management skills.
CO6	Analyze engineering solutions from ethical & sustainability perspectives

Engineering exploration is a Project-based learning (PBL) based course wherein students will apply their technical knowledge, practical skills to develop a project in a team. A group of 5 students (max) normally will be permitted in a team. A set of need statements will be prepared by team members with the help of course coordinators. These need statements will be converted to Problem Statements. Students will follow Engineering Design process to develop conceptual design and detailed design.

Few of the activities which can be carried out are:

- Catapult design, weight bearing structure using newspapers, bridge making, activity with straws, colored paper, box of straws, football with papers, paper plane.
- How do you think Engineering design case studies for designing Panipuri/ tea/ coffee vending/pan making vending machines, grass cutter/mower machine, winding machines, chips making machine, home automation etc (block diagram and components in different blocks), Pugh chart examples.
- Building mechanisms using gears and other components, design mechanisms using linkages, auto inventor for model designing.
- Arduino based experimentation and programming.
- Preparation of timelines for project management.
- Presentation of case studies for ethics, sustainability, and carbon footprint.

Approved in XXIIIrd Academic Council, Dated 23 June 2021

Detailed Syllabus:

	Content
Module1	**Introduction to Engineering and Engineering Study** 2hrs Introduction to Engineering and Engineering Study: Difference between science and engineering, scientist and engineer needs and wants, various disciplines of engineering, some misconceptions of engineering, Expectation for the 21st century engineer and Graduate Attributes.
Module2:	**Engineering Design** 15hrs Engineering Design Process, Multidisciplinary facet of design, Pair wise comparison chart, Introduction to mechatronics system, generation of multiple solution, Pugh Chart, Motor and battery sizing concepts, introduction to PCB design
Module3	**Mechanisms** 4hrs Basic Components of a Mechanism, Degrees of Freedom or Mobility of a Mechanism,4 Bar Chain, Crank Rocker Mechanism, Slider Crank Mechanism.
Module 4	**Platform based-development** 12 hrs Introduction to various platform-based development (Arduino) programming and its essentials, Introduction to sensors, transducers and actuators and its interfacing with Arduino, Introduction to Data Acquisition and Analysis
Module 5	**Project Management** 3 hrs Introduction to Agile practices, Significance of teamwork, Project management tools: Checklist, Timeline, Gantt Chart, Significance of documentation
Module 6	**Sustainability and Ethics in Engineering** 4 hrs Introduction to sustainability, Sustainability leadership, carbon footprint Identifying Engineering as a Profession, Significance of Professional Ethics, Code of Conduct for Engineers, Identifying Ethical Dilemmas in different tasks of engineering, Plagiarism check for research papers
Total Contact Hours	40 Hrs
Course Project Reviews Evaluation of group projects	08 hrs

Mapping of Course outcome with Program Outcomes and Program Specific Outcomes

Course Outcomes	PO1	PO2	PO3	PO 4	PO 5	PO6	PO 7	PO 8	PO9	PO10	PO11	PO12
CO1	2	1				1					1	1
CO2	2	2	2	1	1				3	1		
CO3	2	2	3	2	2	1	1		3	1	2	
CO4	2	2	2	2	2				1	1	2	1
CO5		2	2	2	2	1	1	1	3	1	3	
CO6						1	3	3				

1-Low, 2-Medium, 3-High

Approved in XXIIIrd Academic Council, Dated 23 June 2021

CHBS1002 - Lab Engineering Chemistry		
Teaching Scheme	**Examination Scheme**	
Practical: 02Hrs/Week	**ISE I**	**25 Marks**
Credits: 01	**ISE II**	**25 Marks**

Course Outcomes:

After completion of this course students will be able to:

	Course Outcomes
CO1	Perform qualitative and quantitative determination of physical and chemical properties of lubricants, polymers and water used for domestic and industrial application.
CO2	Explain the objectives of experiments, perform the experiments, appropriately record the data and analyze the results with accuracy and precision.
CO3	Demonstrate laboratory skills by use of relevant instrument or modern analytical methods for analysis of chemical compounds.
CO4	Work effectively and safely in a laboratory environment in teams as well as independently.
CO5	Recognize the issues of safety regulations, ethical, societal, economical and environmental issues in the use of chemicals in their laboratory work.

List of the Experiments – Any Ten from the following – 05 Mark Each

Sr. No.	Title of the Experiments	Skill / Knowledge Level	CO	Marks for ISE
1	Determination of Hardness of Water by EDTA method.	S1/K1	CO1, CO5, CO2	05
2	To determine the chloride content of water sample by Mohr's method.	S2/K1	CO1, CO5, CO2	05
3	Determination of Acid Value of lubricant.	S1/K1	CO1, CO5, CO2	05
4	Determination of Saponification Value of lubricant.	S1/K1	CO1, CO5, CO2	05
5	Determination of Viscosity of lubricating oils by Redwood Viscometer.	S3/K2	CO1, CO3, CO4, CO2	05
6	Determination of Flash & Fire point of lubricant oil.	S3/K2	CO1, CO3, CO4, CO2	05
7	To Determination P^H value of solutions by indicator, paper and by P^H meter.	S1/K1	CO3, CO5, CO2	05
8	Preparation of Phenol Formaldehyde Resin (Bakelite).	S2/K2	CO2, CO4, CO5	05
9	To determine % purity of an iron form an ore.	S2/K2	CO1, CO4, CO5, CO2	05
10	Determination of Cloud & Pour point of lubricating oils.	S3/K2	CO3, CO5, CO2	05
11	To determine the empirical formula of ferric-5 sulpho salicylate complex by Jobs method.	S3/K2	CO3, CO2	05
12	Determination of Chemical Oxygen Demand (C.O.D.) of waste water.	S2/K2	CO1, CO5, CO2	05
13	Determination of Alkalinity of water sample.	S2/K2	CO1, CO5, CO2	05

Approved in XXIIIrd Academic Council, Dated 23 June 2021

14	Potentiometric Titrations	S3/K2	CO3, CO5, CO2	05
15	Determination of Acid Value of plastic.	S1/K1	CO1, CO5, CO2	05
16	Determination of Saponification Value of plastic.	S1/K1	CO1, CO5, CO2	05

Mapping of Lab Course Outcome with Programme Outcomes

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12
CO 1	3	1	1	1				1				1
CO 2	3	2	1	1				1				1
CO 3	3	1	1	1	2			1				1
CO 4	2							1	3			1
CO 5	2		1			2	2	1	1			1

1-Low, 2-Medium, 3-High

Approved in XXIIIrd Academic Council, Dated 23 June 2021

CEES1005: LAB- ENGINEERING MECHANICS		
Teaching Scheme	**Examination Scheme**	
Practical: 2Hrs/Week	**ISE I**	**25 Marks**
Credits:01	**ISE II**	**25 Marks**
	End Semester Evaluation	-

Course Outcomes:

After completion of this course students will be able to:

	Course Outcomes
CO1	Apply graphical method to solve problems of statics.
CO2	Demonstrate the principles of Engineering Mechanics experimentally and interpret the experimental results.
CO3	Solve numerical examples in statics and dynamics.

List of the Experiments/ Term Work

The student shall use graphical method to solve the problems of engineering mechanics (Sr. No. 1) and perform the experiments given below. They should also complete the tutorial problems of the subject Engineering Mechanics given by the teacher as a part of laboratory work.

Sr. No.	Title of the Experiments/Term Work	Skill / Knowledge Level	CO	Marks for ISE
1	Graphical solutions for the following problems a. Resultant of Coplanar Non Concurrent force system: i) At least one problem with resultant as a force ii) At least one problem with resultant as a couple b. Equilibrium of Coplanar Non Concurrent force system: At least one Problem c. Friction: At least one Problem	K2, K3	CO1	15
2	Following experiments shall be conducted. a. Polygon law of forces b. Law of moments c. Jib crane d. Beam reaction e. Friction f. Screw jack g. Fly wheel	K1, K2, K3	CO2	30
3	Tutorial Problems a. At least three problem on each unit of the theory course of Engineering Mechanics. b. The tutorial problem needs to be solved by the student during the practical hours only.	K1,K2, K3	CO3	05

Approved in XXIIIrd Academic Council, Dated 23 June 2021

Mapping of Course outcome with Program Outcomes and Program Specific Outcomes

Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	1	1	1							
CO2	3	1	1	3	2							
CO3	3	2	2	1	1							

1-Low, 2-Medium, 3-High

Approved in XXIII[rd] Academic Council, Dated 23 June 2021

INHS1002 LAB -COMMUNICATION SKILLS		
Teaching Scheme	**Examination Scheme**	
Practical: 2Hrs/Week	**ISE I**	**25 Marks**
Credits:01	**ISE II**	**25 Marks**

Course Outcomes:

After completion of this course students will be able to:

	Course Outcomes
CO1	Introduce Oneself in detail and acquire the skill of communication to achieve excellence in academic and professional carrier
CO2	Develop leadership qualities and construct managerial skills
CO3	Use appropriate Vocabulary pertaining to real-world professional scenarios.
CO4	Enhance the listening and understanding capacity
CO5	Utilize the techniques of E-communication

List of Experiments: (Any Ten Experiments)

Sr. No.	Title of the Experiments	Skill / Knowledge Level	CO	Marks for ISE
1	Communication Skills Different Communication Situation. (Formal, Informal, Upward, Downward . etc)	S1/K2	CO3	05
2	Practical based on JAM Session	S1/K1	CO1	05
3	Debate session	S1/K2	CO2/CO3	05
4	Group discussion	S1/K2	CO2	05
5	Practical based on Advertisement	S1/K1	CO3	05
6	Interview session	S1,S2/K2	CO3	05
7	Power Point Presentation	S1,S2/K2	CO1/CO2	05
8	Listening Skills (Listen to the Audio and Answer the Questions)	S2,S3/K2	CO4	05
9	Practical based on business correspondences (E-mail writing ,letter writing)	S1/K2	CO5	05
10	Analyze the Data and answer The questions	S1/K1	CO4	05
11	Remedial Grammar And Vocabulary Building	S1/K1	CO3	05
12	Practical based on Video conferencing	S1/K1	CO5	05

Approved in XXIIIrd Academic Council, Dated 23 June 2021

Mapping of course outcome with Program outcomes

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1						1				3		
CO 2						1				3		2
CO 3						1				3		1
CO 4										3		
CO 5					3				3	3		1

1-Low, 2-Medium, 3-High

Approved in XXIIIrd Academic Council, Dated 23 June 2021

CEES1001: BASICS OF CIVIL ENGINEERING		
Teaching Scheme	**Examination Scheme**	
Lectures: 03 hrs/ week	**ISE I**	**15 Marks**
Credits: 3	**ISE II**	**15 Marks**
	ISE III	**10 Marks**
	End Semester Examination	**60 Marks**

Prerequisites: Nil

Course description: Objective of this course is to provide an insight and inculcate the essentials of Civil Engineering discipline to the students of all branches of Engineering and to provide the students an illustration of the significance of the Civil Engineering Profession in satisfying the societal needs. Civil engineers plan, design, build, supervise and maintain infrastructure projects such as public and private utility buildings, roads, bridges, water supply and sewage treatment schemes, Irrigation projects etc. This course will give an understanding to the students of the vast breadth and various areas of engagement available in the overall field of Civil Engineering.

Course Outcomes:

After completing the course, students will able to:

	Course Outcomes
CO1	Explain terms related with Building Construction
CO2	Illustrate various surveying techniques.
CO3	Explain the uses of civil engineering materials and explain the types of roads
CO4	Demonstrate construction equipments and terms related with earthquake
CO5	Sketch Environment and Irrigation works

Detailed Syllabus:

Unit 1	**Building Construction** Early constructions and developments over time; Ancient monuments & Modern marvels; Development of various materials of construction and methods of construction Site selection, Principles of planning, typical plan of residential building, plinth area, carpet area, Floor Space Index, Cost of building, Building Bye-laws. Loads coming on structure, Types of construction a) Load bearing structure b) Framed Structure. Function of foundation, Column footing, combined footing and machine foundation. Superstructure and its components, typical cross section through load bearing wall, Brick and stone masonry used for construction, Technical terms related with doors, windows and stairs.
Unit 2	**Geographical Measurement** Principles of survey, measurement of distance by chain and tape, laser distance meter, base line and offsets, Equipments for laying offsets, Prismatic compass, measurement of bearing and calculation of included angles, study and use of dumpy level, levelling staff, bench mark, determination of reduced levels, Modern surveying equipments, Remote sensing and GIS, uses of Toposheets and Contours

Approved in XXIIIrd Academic Council, Dated 23 June 2021

Unit 3	**Civil Engineering Materials, Road Construction** Study of properties and uses of different engineering materials a) Bricks b)Stones c) Aggregates d) Sand e) Cement f) Concrete g) Steel h)Paving Blocks i) Autoclaved Aerated Concrete Blocks j) Paints Classification of roads, Rigid and flexible pavements, typical road sections in cutting and embankment, function of Camber, Super-elevation, Intelligent Transport systems and Road safety, various types of bridges.
Unit 4	**Earthquake Engineering, Construction equipments** Causes of earthquake, Changes in earth crust during earthquake, Technical terms related with earthquake, Earthquake measurement, Factors affecting damage, Consideration of earthquake forces in design of buildings, Earthquake resistant buildings, Precautions to be taken before and during an earthquake. Major Construction equipments: Earth Moving Equipments, Pavers, Ready Mix Concrete Plants; Automation & Robotics in Construction, Software used in civil engineering
Unit 5	**Environment & Water Resources Engineering** Definition of watershed, Necessity of watershed management works. Different structures involved in watershed management. Roof top rainwater harvesting and ground water recharge. Classifications of dams, Typical cross section of gravity dam and zoned earthen embankment. Necessity of irrigation and benefits of irrigation. Water treatment units and component parts of water supply system; Sewage treatment units and sewerage systems; Necessity of Solid waste management

Text and Reference Books

1. P.C.Verghese "*Building Construction*", 2nd ed, PHI Learning Pvt. Ltd.
2. N.N.Basak , "*Surveying and Levelling*", 2nd ed , McGraw Hill Education
3. Garg S.K. "*Irrigation Engineering and Hydraulic Structures*", 36th ed, Khanna Publishers, Delhi.
4. Jai Krishna, Brijesh Chandra "*Elements of Earthquake Engineering*" 2nd ed, South Asian Publishers
5. Shah, Kale and Patki "*Building Design and Drawing*", 5th ed, TATA Mc Graw Hill
6. Birdie G.S. " *Water Supply and Sanitary Engineering*" Standard Publishers Distributors
7. S.K.Khanna, C. E. G. Justo "*Highway Engineering*" 10th ed, Nemchand & Bros
8. J.V.S.Murthy, "*Watershed Management*" 2nd ed, New Age International Publishers

Mapping of Course outcome with Program Outcomes and Program Specific Outcomes

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO1	PO12
CO1	3	2				2			1			
CO2	3	2							1			
CO3	3	2				2			1			
CO4	3	2				2	2		2			
CO5	3	2				2	2		2			

1-Low, 2-Medium, 3-High

Approved in XXIIIrd Academic Council, Dated 23 June 2021

CEES1002: LAB-BASICS OF CIVIL ENGINEERING		
Teaching Scheme	**Examination Scheme**	
Practical: 02 hrs/ week	**ISE I**	**25 Marks**
Credits:1	**ISE II**	**25 Marks**

Prerequisites: Nil

Course description: Objective of this course is to provide an insight and inculcate the essentials of Civil Engineering discipline to the students of all branches of Engineering and to provide the students an illustration of the significance of the Civil Engineering Profession in satisfying the societal needs. Civil engineers plan, design, build, supervise and maintain infrastructure projects such as public and private utility buildings, roads, bridges, water supply and sewage treatment schemes, Irrigation projects etc. In this course the students will have to write the information of different civil engineering structures along with sketches wherever necessary. While drawing the sketches, students are expected to see the structures, measure the dimensions and conduct the practical if necessary.

Course Outcomes:

After completing the course, students will able to:

	Course Outcomes
CO1	Explain terms related with Building Construction
CO2	Demonstrate the uses of basic surveying equipments
CO3	Explain the properties of materials and types of roads
CO4	Demonstrate construction equipments and terms related with earthquake
CO5	Summarize the water, wastewater Treatment units and types of dams

Detailed Syllabus: The term work shall consist of at least 10 exercises of following nature. Individual subject teacher shall have freedom of including additional exercises.

1	Identify 5 ancient monuments and 5 modern marvels and list the uniqueness of each
2	Draw line plans of Residential Buildings/Flats
3	Draw the plan and sectional elevation of Door and Window
4	Draw the Plan and sectional elevation of Staircase
5	Draw different types of foundations
6	Measure the dimensions of Rooms/Hall and Furniture and write it
7	Find the level difference between two stations by using Level
8	Find out the latitude, longitude and Reduced level of different stations, Bearing of line by using software Apps
9	Draw typical road sections in cutting and embankment
10	Identify three top new materials and write their potential in construction
11	Visit the Concrete Technology Laboratory/Strength of Materials Laboratory/Geotechnical Engineering Laboratory and enlist the equipments and their uses
12	Explain the terms related with earthquake along with sketch
13	Draw the sketch of building showing the measures taken against earthquake
14	Explain different types of construction equipments
15	Draw the flow chart of water and sewage treatment plant
16	Draw the section of earthen and Gravity dams
17	Identify three different irrigation projects and write their features
18	Draw different types of Roof Top Rainwater Harvesting Works
19	Enlist the different types of software used in civil engineering and their uses

Approved in XXIIIrd Academic Council, Dated 23 June 2021

Text and Reference Books

1. P.C.Verghese "*Building Construction*", 2nd ed, PHI Learning Pvt. Ltd.
2. N.N.Basak , "*Surveying and Levelling*", 2nd ed, McGraw Hill Education
3. Garg S.K. "*Irrigation Engineering and Hydraulic Structures*", 36th ed, Khanna Publishers, Delhi.
4. Jai Krishna, Brijesh Chandra "*Elements of Earthquake Engineering*" 2nd ed, South Asian Publishers
5. Shah, Kale and Patki "*Building Design and Drawing*", 5th ed, TATA Mc Graw Hill
6. Birdie G.S. " *Water Supply and Sanitary Engineering*" Standard Publishers Distributors
7. S.K.Khanna, C. E. G. Justo "*Highway Engineering*" 10th ed, Nemchand & Bros
8. J.V.S.Murthy, "*Watershed Management*" 2nd ed, New Age International Publishers

Mapping of Course outcome with Program Outcomes and Program Specific Outcomes

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO1	PO12
CO1	3			2		2			2			
CO2	3			2					2			
CO3	3			2		2						
CO4	3			2			2					
CO5	3			2			2					

1-Low, 2-Medium, 3-High

APPROVED

Approved in XXIIIrd Academic Council, Dated 23 June 2021

MEES1003: Basics of Mechanical Engineering		
Teaching Scheme	**Examination Scheme**	
Lectures: 03 hrs/ week	**ISE I**	**15 Marks**
Credits:03	**ISE II**	**15 Marks**
	ISE III	**10 Marks**
	End Semester Examination	**60 Marks**

Prerequisites: Nil

Course description:

After completing this course student will have a fundamental understanding of the thermodynamics, thermal machine source of energy, power transmission element, identify manufacturing process and Engineering Materials

Course Outcomes:

After completing the course, students will able to:

	Course Outcomes
CO1	Explain basic concepts to be used in Mechanical Engineering.
CO2	Apply the principles of thermodynamics to solve Numerical Problems
CO3	Compare the working principles of thermal machines with relevant safety procedures and their applications in Mechanical Engineering
CO4	Explain the working principles and basic operating safety procedures of various power transmission elements employed in Mechanical Engineering.
CO5	Compare the Manufacturing Process and Engineering Material based upon the required application.

Detailed Syllabus:

Unit 1	**Fundamentals of Thermodynamics:** Pressure and pressure measurement (Analytical treatment), Temperature, Zeroth law of thermodynamics, Measurement of temperature, Thermometer, forms of energy, Work transfer, P-dV work, other forms of work transfer, Heat Transfer, Concept of Specific Heat, Sensible Heat, Latent Heat First law of Thermodynamics: Law of Conservation of Energy, Joule's experiment, First law for Cyclic and non-Cyclic processes, Concept of Internal Energy, Enthalpy, Ideal Gases – Concept of Constant Pressure, Constant Volume, Constant Temperature, Adiabatic, Polytropic, Throttling Processes and their representation on p-V and T-s diagrams (fundamental numerical treatment)
Unit 2	**Applied Thermal Engineering** Introduction to Thermal Machines & Sources of Energy: Working principles and application of Internal Combustion Engines –(2-stroke and 4- stroke engines), Steam Turbines, Compressor, Refrigerator, (Description with block diagrams), Renewable and non-Renewable energy, Principles and working of – Steam Power Plant, NuclearPower Plant, (Description with block diagrams)

Approved in XXIIIrd Academic Council, Dated 23 June 2021

Unit 3	**Fundamentals of Power Transmitting Elements** Power Transmitting Elements: Working principles and application of – Shaft, Axle and Spindles. Couplings- types of couplings, Friction Clutches, Bearings, Brakes- types of brakes, Drives – Belt drives, construction, Chain drives, Gears- classification of gears, Terminology of Spur Gear, and its applications
Unit 4	**Fundamental of Manufacturing Process** Introduction to Manufacturing Processes and their applications, casting (sand Casting), forging, welding (Electric Arc welding), brazing and soldering Sheet metal forming (Bending, Drawing) and Basic Engineering Materials.
Unit 5	**Fundamentals of Machine Tools** Basic Elements, Working Principle and operations performed on Lathe Machine, Drilling Machine and Milling Machine and their applications in practice.

Approved in XXIIIrd Academic Council, Dated 23 June 2021

MEES1004: Lab-Basics of Mechanical Engineering		
Teaching Scheme	**Examination Scheme**	
Practical: 02 hrs/ week	**ISE I**	**25 Marks**
Credits:01	**ISE II**	**25 Marks**

List of Experiments:

Sr. No.	Title of the Experiments
1.	Study and Demonstration of operation of IC Engine with relevant safety procedures
2.	Study and Demonstration of operation of Refrigerator with relevant safety procedures
3.	Study and Demonstration of working of Brakes, Clutch and couplings with relevant safety procedures
4.	Study and Demonstration of working Bearings and Gears with relevant safety procedures
5.	Study and Demonstration of Working of Welding Process with relevant safety procedures
6.	Study and Demonstration of working of Lathe Machines, Milling Machines with relevant safety procedures
7.	Industrial Visit

Text Books and Reference Books

1. Nag P.K., *"Engineering Thermodynamics"*, 3rd ed.Tata-McGraw Hill Publications, 2013.
2. Rajput R.K., *"Engineering Thermodynamics"*, 4th ed.Laxmi Publications, 2014.
3. Hajra Choudhary, Bose, *"Work Shop Technology* (Vol.-I &II)", 3rd ed. MPP publication, 2018.
4. Bhandari V.B., *"Machine Design"*, 3rd ed. Tata-McGraw Hill Publications, 2019.
5. Khurmi R.S., *"Machine Design"*, 4th Edition. Eurasia Publishing House, 2019.
6. DomkundwarV.M. *"Engineering Thermodynamics"*, 4th ed .Dhanpatra I Publication, 2020.
7. RaoP.N, "*Manufacturing Technology* Volume I", 3rd ed. Tata-McGraw Hill Publications,2019.

Mapping of Course outcome with Program Outcomes and Program Specific Outcomes for Basics of Mechanical Engineering

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	2										
CO2	3	1			1	1						
CO3	1					1						
CO4	1					1						
CO5	1											

1-Low, 2-Medium, 3-High

Approved in XXIIIrd Academic Council, Dated 23 June 2021

SYLLABUS : ELECTRICAL BRANCH		
EEES1001: Fundamentals of Electrical Engineering		
Teaching Scheme	**Examination Scheme**	
Lectures: 3 hrs/ week	**ISE I**	**15 Marks**
Credits: 3	**ISE II**	**15 Marks**
	ISE III	**10 Marks**
	End Semester Examination	**60 Marks**

Prerequisites: Nil

Course description:

This is the basic course in Electrical Engineering which introduces the basic concepts, different theorem and laws, Electrical circuits to the students.

The objectives of the course are to
1. Impart a basic knowledge of electrical quantities such as current, voltage, power, energy and frequency
2. Acquaint with basic laws and theorems of electrical networks
3. Explain fundamentals of magnetic circuits and alternating current circuits and solve the circuit problems
4. Understand the fundamentals and concept of electrical energy storage devices, wiring fundamentals, safety devices and metering

Course Outcomes:

After completing the course, students will able to:

	Course Outcomes
CO1	Explain the fundamental concepts of AC and DC circuits, electromagnetic induction, energy storage systems, electrical wiring, LED and solar lights, electrical accessories and metering devices.
CO2	Apply different theorems and electro-magnetic laws for solving AC-DC electric circuits.
CO3	Illustrate the performance of single phase and three phase ac circuits using phasor analysis.
CO4	Compute the various parameters require for battery charging system, kW-kVA based energy consumption and plan the wiring layout for a given household/commercial applications.
CO5	Choose the appropriate energy storage element, protective elements and meters for a given application.

Approved in XXIIIrd Academic Council, Dated 23 June 2021

Detailed Syllabus:

Unit I	**D.C. Circuit** Introduction of circuit active and passive parameter of electrical circuit, Kirchhoff current and voltage laws, Source conversion, series and parallel circuit, current and voltage division rule, Delta-Star and Star-Delta conversion, Node Analysis and Mesh Analysis methods Network Theorem: Superposition theorem, Thevenin's and Norton's theorems Maximum power transfer theorem (Numerical limited to two sources), Charging and discharging of capacitor, Time constant for RC circuit
Unit II	**Electromagnetic Induction** : Faraday's laws, statically and dynamically induced emf , self and mutual inductance, coefficients of coupling, dot convention, inductance in series and parallel, Magnetic Circuits: Terms related with magnetic circuits, Magnetization curve, Magnetic leakage and fringing, Leakage coefficient, Series and parallel circuits, magnetic hysteresis, and eddy current loss, Rise and decay of current in inductive circuit, Time constant for RL circuit
Unit III	**Single phase and Three phase AC Circuits**: Brief description of electrical energy Generation, Transmission and Distribution system, Types of generation stations :Conventional and Non conventional, Concept of single phase supply, Terms related with A.C. quantities , pure resistive, inductive and capacitive circuits, Complex and phasor representation of AC quantities, R-L-C series and parallel circuits, resonance in series and parallel circuits, Q-factor of coil ,Three phase AC Circuits: Concept of Three phase supply, star and delta connections line and phase values, phasor diagram, three phase balance star and delta loads and their phasor diagrams.
Unit IV	**Energy Storage Systems** : Types of storage battery , Charging of a cell, Discharging of cell Current , Capacity of the Cell, Depth of Discharge (DOD) of the cell, Capacity of a Secondary Cell, Efficiency of the Cell, Hydrometer Lead Acid Cell: Type, Chemical Reactions, Charging of secondary cell, Maintenance, Defects and Causes Construction and application: Advanced Lithium Battery, Nickel Metal Hydride Battery, Li-Ion battery, Thin Film solid state Batteries, Super capacitors: Fundamental, Construction and application. Battery – Solar Cell (Photovoltaic) hybridization, fuel cells, Calculation of Inverter Capacity as per total load, Calculation Battery Back-up Time, recycling of batteries
Unit V	**Electrical Wiring , Accessories and Metering Devices** : Accessories used for electrical wiring, Types of insulated wires & wiring systems, *Concealed* conduit electrical *wiring* systems, Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Concept of earthing, Power rating of different domestic appliances, KWh (Unit) / Energy consumption calculations Study and comparison of Light Emitting Diode (LED) Lamps and Compact Fluorescent Lamps (CFL).*Study of solar lights* Smart Meter Equipment: SMETS1,SMETS2 residential Electricity meter Construction and working of KVAh Meter, KVAh Billing system, Comparison of kWh and kVAh billing, Construction and working of IoT based Three Phase Industrial Meter

SPG

Approved in XIIIrd Academic Council dtd 23 June 2021

Text and Reference Books

1. L. S. Bobrow, *Fundamentals of Electrical Engineering*, Oxford University Press, 2011
2. Vincent Del Toro, *Electrical Engineering Fundamentals*, Prentice Hall India, 2nd ed, 2013.
3. Kothari D. P, Nagrath I. J., *Basic Electrical Engineering*, Tata McGraw Hill, 2010
4. M. S. Naidu, S. Kamakshaiah, *Introduction to Electrical Engineering*,Tata McGraw-Hill Education, 1995
5. J. P. Tiwari, *Basic Electrical Engineering*, New Age Publication, 2013
6. Mahmood Nahvi and Joseph A. Edminister, *Electric Circuits, Schaum's Outline Series*, McGraw Hill, (2002)
7. E. Hughes, *Electrical and Electronics Technology*, Pearson, 2010
8. T. Minami, M. Tatsumisago, M. Wakihara, C. Iwakura, S. Kohijiya, *Solid state ionics for batteries*, Springer Publication, 2009
9. Sandeep Dhameja, *Electric Vehicle Battery Systems*, New age publication, 2001.
10. Bard, Allen J. and Larry R. Faulkner. *Electrochemical Methods: Fundamentals and Applications.* 2nd ed, Wiley– VCH, Verlag, GmbH, 2000
11. D. Linden and T. S. Reddy, *Handbook of Batteries*, 3rd ed, McGraw-Hill, 2002.

Mapping of Course outcome with Program Outcomes and Program Specific Outcomes

Course outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	--	--	--	--	1	1	1	1	1	--	2
CO2	2	1	--	--	--	1	1	1	1	1	--	2
CO3	3	2	--	--	--	2	1	2	2	2	--	1
CO4	3	2	1	--	--	2	2	2	2	2	--	2
CO5	3	1	1	--	--	2	2	1	2	1	--	2

1-Low, 2-Medium, 3-High

Approved in XXIIIrd Academic Council, Dated 23 June 2021

EEES1002 : Lab Fundamentals of Electrical Engineering		
Teaching Scheme	**Examination Scheme**	
Practical: 2Hrs/Week	**ISE I**	**25 Marks**
Credits:1	**ISE II**	**25 Marks**

Course Outcomes:

After completion of this course students will be able to:

	Course Outcomes
CO1	Apply electrical safety measures in the laboratory
CO2	Verify AC and DC theorem to determine the electric circuit parameters
CO3	Demonstrate and verify relationship of various electric circuit parameters
CO4	Calculate the different performance parameters of energy storage devices and of lamps
CO5	Select the suitable ranges and types of measuring and safety meters for the given circuit.

List of the Experiments:

The student shall perform minimum TEN experiments from the following list

Gr. No.	Sr. No.	Title of the Experiments	Skill / Knowledge Level	CO	Marks for ISE
I	1	Perform an experiment for Verification of Thevenin's theorem and Norton's theorem	K2	CO1,CO2,CO3, CO5	3
	2	Perform an experiment for Verification of Superposition theorem,	K2	CO1,CO2,CO3, CO5	3
	3	Perform an experiment for Verification of Maximum power transfer theorem	K2	CO1,CO2,CO3, CO5	3
II	4	To Perform an experiment for the demonstration of electromagnetic induction phenomenon OR Describe one experiment to demonstrate the phenomenon of electromagnetic induction.	K2	CO1,CO2,CO3	4
	5	To perform an experiment to measure the induction voltage in a conductor loop through magnetic field	K2	CO1,CO2,CO3	3
	6	To Perform an experiment to plot hysteresis loop/B-H curve of magnetic material	K2	CO1,CO2,CO3	3
III	7	To perform experiment for Measurement of current, voltage and power in R-L-C series exited by single phase AC supply	K3	CO1,CO2,CO3	4
	8	To Study the R-L-C series resonance circuit	K2	CO1,CO2,CO3	3
	9	To perform experiment for Measurement of three phase power under balance condition for Star and Delta connected load	K3	CO1,CO2,CO3	3

Approved in XXIIIrd Academic Council, Dated 23 June 2021

IV	10	To perform an experiment for fully charged and discharged conditions of a Lead-acid battery	K2	CO1,CO2,CO3, CO4	3
	11	To perform experiment for calculation of the battery backup time as per load capacity for residential consumer	K3	CO1,CO2,CO3, CO4	3
	12	To Study different types of Storage Batteries & its charging system OR To study of Effect of operating temperature on service life – other characteristic curves OR To study of Secondary batteries- Discharge curves - Terminal voltages Plateau voltage	K3	CO1,CO2,CO3, CO4	4
V	13	Comparative study of energy consumption between LED,CFL and Solar light –A case study for residential consumer	K3	CO1,CO2,CO3, CO5	4
	14	To perform an Experiment on Measurement of Lumen/ Lux of different lamps by Lux meter	K2	CO1,CO2,CO3, CO5	3
	15	To perform experiment for measurement of power consumption of a LED lamp, CFL lamp	K2	CO1,CO2,CO3, CO5	3

Note: The students will be required to perform the 10 experiments from the above list and any other relative experiments designed on the basis course

Mapping of Course outcome with Program Outcomes

Course outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2				1	3	2	2	3	2	1	3
CO2	3	1		1	1	2	2	2	3	2	1	3
CO3	3	1		1	1	2	2	2	3	2	1	3
CO4	3	1		1	1	2	2	2	3	2	1	3
CO5	2	1		1	1	2	2	2	3	2	1	3

1-Low, 2-Medium, 3-High

Approved in XXIIIrd Academic Council, Dated 23 June 2021

SYLLABUS : NON-ELECTRICAL BRANCH		
EEES1004 : Elements of Electrical Engineering		
Teaching Scheme	**Examination Scheme**	
Lectures: 3 hrs/ week	**ISE I**	**15 Marks**
Credits: 3	**ISE II**	**15 Marks**
	ISE III	**10 Marks**
	End Semester Examination	**60 Marks**

Prerequisites: Nil

Course description:
This is the basic course in Electrical Engineering which introduces the basic concepts, different theorem and laws, Electrical circuits to students

The objectives of the course are to-
1. Impart a basic knowledge of electrical quantities such as current, voltage, power, energy and frequency
2. Acquaint with basic laws & theorems of electrical networks
3 .Explain fundamentals of magnetic circuits and alternating current circuits and solve the circuit problems
4. Identify the electrical machines
5. Illustrate electrical wiring fundamentals, safety devices and metering

Course Outcomes:

After completing the course, students will able to:

	Course Outcomes
CO1	Explain the fundamental concepts of AC and DC circuits, electromagnetic induction, energy storage systems, electrical wiring, electrical machines, LED and solar lights, electrical accessories and metering devices.
CO2	Apply different theorems and electro-magnetic laws for solving AC-DC electric circuits.
CO3	Illustrate the performance of single phase and three phase ac circuits using phasor analysis.
CO4	Calculate the different parameters of DC machines and induction Motors from given data.
CO5	Choose the appropriate electrical machines, protective elements and meters for a given application.

Detailed Syllabus:

Unit I	**D.C. Circuit** Introduction of circuit active and passive parameter of electrical circuit, Kirchhoff current and voltage laws, Source conversion, series and parallel circuit, current and voltage division rule, Delta-Star and Star-Delta conversion
Unit II	**Electromagnetic Induction** : Faraday's laws, statically and dynamically induced emf, self and mutual inductance, coefficients of coupling. Magnetic Circuits: Terms related with magnetic circuits, Magnetization curve, Magnetic leakage and fringing, Leakage coefficient, Series and parallel circuits, magnetic hysteresis and eddy current loss

Approved in XXIIIrd Academic Council, Dated 23 June 2021

Unit III	**Single phase and Three phase AC Circuits:** Brief description of electrical energy Generation, Transmission and Distribution system, Types of generation stations :Conventional and Non conventional, Concept of single phase supply, Terms related with A.C. quantities, pure resistive, inductive and capacitive circuits, Complex and phasor representation of AC quantities, R-L-C series and parallel circuits, resonance in series and parallel circuits. Three phase AC Circuits: Concept of Three phase supply, star and delta connections line and phase values, phasor diagram, Measurement of three power by using Wattmeter
Unit IV	**Introduction of Electrical Machines:** Classification of Electrical Machines, Construction ,working and application: single phase transformer, three phase Transformer, Single phase induction motor, Three Induction motors and DC motors (No Numerical)
Unit V	**Electrical Wiring and Accessories and Metering:** Accessories used for electrical wiring, wires & wiring systems, *Concealed* conduit electrical *wiring* systems, Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB,, concept of earthing, KWh (Unit) / Energy consumption calculations Study of Light Emitting Diode (LED) Lamps and Compact Fluorescent Lamps (CFL)*and solar lights.* Smart Meters, Mains intake and distribution of electrical energy in consumer's premises – Distribution board system, Calculation of load and estimation of a typical one BHK house wiring. Safety, electric shock, first aid for electric shock and other hazards, safety rules

Text and Reference Books

1. L. S. Bobrow, *Fundamentals of Electrical Engineering*, Oxford University Press, 2011
2. Vincent Del Toro, *Electrical Engineering Fundamentals*, Prentice Hall India, 2nd ed, 2013.
3. Kothari D. P, NagrathI. J., *Basic Electrical Engineering*, Tata McGraw Hill, 2010. 4. M.S.Naidu, S.Kamakshaiah, *Introduction to Electrical Engineering*,Tata McGraw-Hill, 1995
4. J.P.Tiwari, *Basic Electrical Engineering*, New Age Publication, 2013.
5. Mahmood Nahvi and Joseph A. Edminister, *Electric Circuits*, Schaum Outline Series, McGrawHill, (2002)
6. E. Hughes, *Electrical and Electronics Technology*, Pearson, 2010

Approved in XXIIIrd Academic Council, Dated 23 June 2021

Mapping of Course outcome with Program Outcomes and Program Specific Outcomes

Course outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	--	--	--	--	1	1	1	1	1	--	1
CO2	3	1	--	--	--	1	1	1	1	1	--	1
CO3	3	2	--	--	--	3	1	2	2	2	--	1
CO4	3	2	1	--	--	3	2	2	2	2	--	2
CO5	3	1	1	--	--	2	2	1	2	1	--	2

1-Low, 2-Medium, 3-High

Approved in XXIIIrd Academic Council, Dated 23 June 2021

EES1005: Lab Elements of Electrical Engineering		
Teaching Scheme	**Examination Scheme**	
Practical: 2Hrs/Week	**ISE I**	**25 Marks**
Credit:1	**ISE II**	**25 Marks**

Course Outcomes:

After completion of this course students will be able to:

	Course Outcomes
CO1	Apply electrical safety measures in the laboratory
CO2	Verify various electric laws and theorem to determine the electric circuit and electromagnetic circuit parameters
CO3	Determine the relationship of various electric circuit parameters
CO4	Demonstrate the fundamental and working of electrical machines
CO5	Identify the appropriate protective elements, wires and meters for the given circuit and evaluate the various parameters of lamps

List of the Experiments:

The student shall perform minimum TEN experiments from the following list

Gr. No.	Sr. No.	Title of the Experiments	Skill / Knowledge Level	CO	Marks for ISE
I	1	Introduction of tools, electrical materials, safety procedure, symbols and abbreviations	K2	CO1,CO2,CO3, CO5	3
	2	Perform an experiment for Verification of Kirchhoff's current law and voltage law	K2	CO1,CO2,CO3, CO5	3
	3	Perform an experiment for the verification current and voltage in series and parallel circuit	K2	CO1,CO2,CO3, CO5	3
II	4	To Perform an experiment for the demonstration of electromagnetic induction phenomenon OR Describe one experiment to demonstrate the phenomenon of electromagnetic induction.	K2	CO1,CO2,CO3, CO5	4
	5	To perform an experiment to measure the induction voltage in a conductor loop through magnetic field	K2	CO1,CO2,CO3, CO5	3
	6	To Perform an experiment to plot hysteresis loop/B-H curve of magnetic material	K2	CO1,CO2,CO3, CO5	3
III	7	To perform experiment for Measurement of current, voltage and power in R-L-C series exited by single phase AC supply	K3	CO1,CO2,CO3, CO5	4
	8	To Study the R-L-C series resonance circuit	K2	CO1,CO2,CO3, CO5	3

Approved in XXIIIrd Academic Council, Dated 23 June 2021

	9	To perform experiment for Measurement of three phase power under balance condition for Star and Delta connected load	K3	CO1,CO2,CO3, CO5	3
IV	10	To perform experiment for Starting and reversing of D.C. Shunt motor	K2	CO1,CO2,CO3, CO4	3
	11	To perform experiment for starting and reversal of a three phase induction motor	K3	CO1,CO2,CO3, CO4	3
	12	To perform the polarity test and turn ratio test on 1 phase transformer	K3	CO1,CO2,CO3, CO4	4
V	13	To comparative study of energy consumption between LED,CFL and Solar light –A case study for residential consumer	K2	CO1,CO2,CO3, CO5	4
	14	To perform an Experiment on Measurement of Lumen/Lux of different lamps by lux meter	K2	CO1,CO2,CO3, CO5	3
	15	To perform experiment for measurement of power consumption of a LED lamp, CFL lamp	K2	CO1,CO2,CO3, CO5	3

Note: The students will be required to perform the 10 experiments from the above list and any other relative experiments designed on the basis course

Mapping of Course outcome with Program Outcomes and Program Specific Outcomes

Course outcomes	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
CO1	2				1	3	2	2	3	2	1	2
CO2	3	1		1	1	2	2	2	3	2	1	2
CO3	3	1		1	1	2	2	2	3	2	1	2
CO4	3	1		1	1	2	2	2	3	2	1	2
CO5	2	1		1	1	2	2	2	3	2	1	2

1-Low, 2-Medium, 3-High

Approved in XXIIIrd Academic Council, Dated 23 June 2021

ETES1001: Basics of Electronics Engineering		
Teaching Scheme	**Examination Scheme**	
Lectures: 3 Hrs/Week	**ISE I**	**15 Marks**
Credits: 03	**ISE II**	**15 Marks**
	ISE III	**10 Marks**
	End Semester Examination	**60 Marks**

Prerequisites: Nil

Course description:
After completing this course, students will have a broad and fundamental understanding of basic electronics. Students will be able to discuss the basic concepts of various electronics devices and communication techniques with some basic applications.

Course Objectives:

- To impart knowledge of basic electronics devices and its applications
- To create awareness of electronics communication concept
- To introduce basic concepts of consumer electronics and instruments

Course Outcomes:

After completing the course, students will able to:

	Course Outcomes
CO1	Describe the working principle of electronic diodes and transistors
CO2	Explain transistor configurations, their comparison and FET devices
CO3	State basic working of electronics communication systems
CO4	Explain basic principles of satellite communication
CO5	Describe operations of various consumer electronics gadgets
CO6	Illustrate fundamentals of digital electronics

Detailed Syllabus:

Unit 1	**Diodes:** PN junction diode, characteristics and parameter, diode as rectifier, Zener diode: Operation and Applications, photo- Electronic Devices - LEDs, Photo Diode and Applications, LED & LCD Displays.
Unit 2	**Transistors:** BJT, NPN & PNP transistors, structure, working of NPN transistor. Concepts of common base, common emitter & common collector configurations, current gain of each, Input & output characteristics of common emitter configuration, comparison of three configurations with reference to voltage & current gain, input & output resistances and applications. Introduction to JFET, characteristics of MOSFET, CMOS devices
Unit 3	**Radio communication**: Principle of AM & FM, wave forms, bandwidths, block diagrams of AM & FM transmitters, principle of AM &FM demodulation, comparison of AM & FM. Introduction to microwaves , microwave frequency bands , mobile communication, Satellite communication: concept of geo-stationary satellite, satellite transponder, block diagram of earth station transmitter & receiver
Unit 4	**Consumer Electronics**:

Approved in XXIIIrd Academic Council, Dated 23 June 2021

	Basic operation of Microphone & its Characteristics, Basic operation of Loudspeakers Concept of acoustic, Loudness level , Decibel level, Sound Level meters, Introduction to Public Address Systems (PA -Systems), Headphone, Earphone, HDTV, CCTV, washing machine, microwave oven, latest electronic gadgets
Unit 5	**Digital Electronics Fundamentals**: Number systems and codes: Binary, Octal, Hexadecimal; BCD, Excess-3, Gray code, Alphanumeric code. Basic and Universal Logic gates, Difference between sequential and combinational Logics

Text and Reference Books

1. Thomas L. Floyd, *"Electronic Devices"*, Pearson Education, 9th ed, 2011
2. R. G. Gupta, *"Audio-Video Engineering"*, 2nd ed, TMG
3. R. S. Sedha, *"A textbook of Applied Electronics"*,.2nd ed., S. Chand Publication
4. Helfric A.D & Cooper W.D, *Modem Electronic Instrumentation &Measurement Techniques,* Pearson Education
5. David A Bell, *Electronic Devices And Circuits*, Oxford University Press
6. Wavne Tomasv. *Advanced Electronic Communication System*, Phi Publishers
7. C. S. Rangan, G. R. Sarma, V. S. V. Mani, *Instrumentation: devices and systems,* Tata McGraw- Hill
8. Albert Paul Malvino, *Electronic Principles*, Tata McGraw- Hill
9. George Kennedy, Bernard Davis, *Electronic Communication Systems*, McGraw Hill
10. Louis E. Frenzel, *Principles Of Electronic Communication Systems*, McGraw Hill

Mapping of Course outcome with Program Outcomes and Program Specific Outcomes

Course outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1										
CO2	2	1										
CO3	1	2										
CO4	1	2										
CO5		2										
CO6		2										

1-Low, 2-Medium, 3-High

Approved in XXIIIrd Academic Council, Dated 23 June 2021

ETES1002: Lab Basics of Electronics Engineering		
Teaching Scheme	**Examination Scheme**	
Practical: 2Hrs/Week	**ISE I**	**25 Marks**
Credits:01	**ISE II**	**25 Marks**

Course Outcomes:

After completion of this course students will be able to:

	Course Outcomes
CO1	Explain the characteristics of semiconductor components and devices
CO2	Perform the experiments based on various communication techniques
CO3	Interpret the operation and working of various logic gates
CO4	Observe the various test point signals of consumer electronics gadgets

List of the Experiments

The student shall perform following experiments

Sr. No.	Title of the Experiments	Skill / Knowledge Level	CO	Marks for ISE
1	Plot the characteristics of semiconductor devices, components	K2, S2	CO1	25
2	Plot the characteristics of transistors MOSFET, CMOS, BJT	K2, S2	CO1	25
3	Observe the input output characteristics of the common emitter configuration	K2, S2	CO1	25
4	Demonstrate different modulation techniques	K2, S2	CO2	25
5	Study of mobile communication	K2, S2	CO2	25
6	Study the Radar/Satellite communication systems	K2, S2	CO2	25
7	Study audio-video systems	K2, S2	CO4	25
8	Observe the various test points signals of consumer electronics gadgets (Any one)	K2, S2	CO4	25
9	Implement the universal logic gates	K2, S3	CO3	25
10	Study of the difference between sequential and combinational circuits.	K2, S3	CO3	25

Approved in XXIIIrd Academic Council, Dated 23 June 2021

Mapping of Course outcome with Program Outcomes and Program Specific Outcomes

Course outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1				1	3							
CO2		1										
CO3		1	2									
CO4				1	2							

1-Low, 2-Medium, 3-High

Approved in XXIIIrd Academic Council, Dated 23 June 2021

CSES1001: Basics of Computer & IT		
Teaching Scheme	**Examination Scheme**	
Lectures: 03 hrs./ week	**ISE I**	**15 Marks**
Credits:03	**ISE II**	**15 Marks**
	ISE III	**10 Marks**
	End Semester Examination	**60 Marks**

Prerequisites: Nil

Course Objectives

- To understand the fundamental hardware and software components that make up a computer and the role of each of these components.
- To understand the basic web technology concepts that are required for developing web applications including cloud.
- To learn the fundamental programming concepts and methodologies which are essential to building C programs.
- To code, document, test, and implement a well-structured, computer programs using the C programming language.

Course Outcomes

Students will be able to:

CO1	Discuss understanding of computer hardware and software
CO2	Describe basic understanding of Web technologies and cloud technologies
CO3	Able to develop C programs
CO4	Able to define data types and use them in simple data processing applications also he/she must be able to use the concept of pointers, array of structures
CO5	Develop confidence and ability for life-long learning needed for Computer language.

Detailed Syllabus:

Unit 1	**Introduction to Computer**: Brief Overview of Computer History. A basic Computer architecture. Hardware & Software Components (disks, memory, processor). Introduction to Web Architecture: two tier, three tier, Multitier. Introduction to Open-Source Software and Types of OSS. System software: Types of software, High level language, Low level language, Translators (Compiler, Interpreter, and Assembler). Operating System and its type.
Unit 2	**Web Technologies**: Introduction to World Wide Web, Internet, Search engines, E-mail, Audio & Video Conferencing, Internet Protocols: FTP, telnet, TCP/IP, SMTP, HTTP, Languages used for WEB Technology: HTML Introduction to Cloud Computing: Defining Cloud computing, cloud architecture Characteristics, Components, Service models: Iaas, PaaS, SaaS, Applications, Benefits & Limitations.
Unit 3	**Introduction to C Language fundamentals:** The C character set, variables and constants, data types, keywords, expressions, statements, precedence, operators- arithmetic operators, sizeof() and ternary operators, relational & logical operators, conditional operators, type conversions , type casting.
Unit 4	**Conditional Branching and Loops:**

Approved in XXIIIrd Academic Council, Dated 23 June 2021

	if, nested if, it else, nested if else switch, goto statement, Loop execution – For loop, while loop, Do while loop, break, and continue statements. Functions - Defining a function, passing arguments to functions, call by value, idea of call by reference, returning values from function, command line arguments, Local & Global, Formal variables concept, Recursion.
Unit 5	**Arrays:** Array's definition (1-D, 2-D), passing array to the function, String Operation-String copy, String length, String concatenation, String compare, Basic Sorting Algorithms (Bubble, Insertion and Selection). Structure: Introduction to structure and union. Array of structure, Passing structure as an object to function. Structure as a return type of function. Pointers- pointer as a variable, pointer to array, pointer as argument to function, notion of linked list.

Text and Reference Books

1. E. Balagurusamy; *Programming in C,* 3rd ed, Tata McGraw Hill.
2. Thomas Erl, Ricardo Puttini, Zaigham Mahmood *"Cloud Computing: Concepts, Technology & Architecture"* 3rd ed Pearson Service Technology
3. Jon Duckett , *"Beginning HTML, XHTML, CSS, and JavaScript".* 2nd ed Wrox Publication
4. Ron Ginlster , *PC Hardware: A Beginner's Guide Paperback,* 3rd ed, Import
5. K. R. Venugopal and S R Prasad, *Mastering C*, 3rd ed, Tata McGrath Hill.
6. Brian W. Kernighan and Dennis M. Ritchie, *The C Programming Language*, 2nd ed, Prentice Hall of India.

Mapping of Course outcome with Program Outcomes and Program Specific Outcomes

Course outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3											
CO2								2	1			
CO3		3								2		
CO4	2	3									1	
CO5				3					1	1		2

1 – Low 2 – Medium 3 – High

Approved in XXIIIrd Academic Council, Dated 23 June 2021

CSES1002: Lab Basics of Computer & IT		
Teaching Scheme	**Examination Scheme**	
Practical: 2Hrs/Week	**ISE I**	**25 Marks**
Credits:01	**ISE II**	**25 Marks**

Course Outcomes:

After completion of this course students will be able to:

	Course Outcomes
CO1	Understand the development environment for compiling, debugging, linking and executing a C program.
CO2	Analyzing the complexity of problems, Modularize the problems into small modules and then convert them into programs
CO3	Apply the in-built functions and customized functions for solving the problems.
CO4	Document and present the algorithms, flowcharts, and programs in the form of user-manuals.
CO5	Demonstrate using of various technologies and tools for developing web sites.

List of the Experiments:

The student shall perform minimum ten experiments of the following using TURBO C&C++/ CodeBlocks

Sr. No.	Title of the Experiments	Skill / Knowledge Level	CO
1	Introduction to HTML tags	K2	CO5
2	Creating Web site using free web hosting	K3	CO5
3	Simple program using scanf() and printf()	K3	CO1
4	Program using Control Statements	K3	CO2
5	Program using Loops	K3	CO2
6	Program to generate Fibonacci series and/or factorial of a number using recursive function	K3	CO3, CO4
7	Creating Web site using free web hosting	K3	CO5
8	Using arrays for sorting numbers -Write a C program to input elements in array and sort array elements in ascending or descending order.	K3	CO4
9	Program which shows use of call by value and call by reference	K3	CO3
10	Program to accept and display student information using structure.	K3	CO2, CO4
11	Program to pass structure/array as a parameter to a function	K3	CO3
12	Program to prepare monthly telephone bill	K3	CO2

Approved in XXIIIrd Academic Council, Dated 23 June 2021

13	Menu driven program for matrix addition and subtraction	K3	CO3
14	Program for matrix multiplication	K3	CO3

Mapping of Course outcome with Program Outcomes and Program Specific Outcomes

Course outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12
CO1	3	2										
CO2	2		3	3								
CO3	2	2										
CO4		2		2		1					1	
CO5									3	2		2

1-Low, 2-Medium, 3-High

Approved in XXIIIrd Academic Council, Dated 23 June 2021

CEES1003: LAB-WORKSHOP		
Teaching Scheme	**Examination Scheme**	
Practical: 04 hrs/ week	**ISE I**	**50 marks**
Credits: 2	**ISE II**	**50 marks**

Prerequisites: Nil

Course description: Objective of this course is to provide an insight and inculcate the essentials of workshop to the students of Civil Engineering discipline and to provide the students an illustration of the significance of the workshop practices. In this course the students will have to prepare jobs as mentioned in the curriculum.

Course Outcomes:

After completing the course, students will able to:

	Course Outcomes
CO1	State & Explain various tools of fitting, carpentry and Sheet metal and aluminum working
CO2	Demonstrate the various operations about fitting, Carpentry, Sheet metal, plumbing and aluminum work

Detailed Syllabus: The term work shall consist of 10 exercises of following nature.

1	**Fitting:** Preparing one job involving simple fitting operations like marking, cutting and fitting different shapes using appropriate files, drilling machines, threading machines etc.
2	**Carpentry**: Preparing three jobs using different carpentry tools and operations.
3	**Sheet Metal Working**: Preparing one job of Sheet metal Using different tools and operations
4	**Plumbing**: Preparing three jobs involving use of different cutting tools, threading tools and fitting operations
5	**Aluminum work**: Preparing two jobs on aluminum

Text and Reference Books:

1. Raghuwanshi B. S., *Workshop Technology, Vol I and II*, Dhanpat Rai and Sons
2. John K.C. , *Mechanical Workshop Practice*, 2nd ed, Prentice Hall of India

Mapping of Course outcome with Program Outcomes and Program Specific Outcomes

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO1	PO12
CO1	1		2	1	2				2			1
CO2	1		2	1	2		1		2			1

1-Low, 2-Medium, 3-High

Approved in XXIIIrd Academic Council, Dated 23 June 2021

MEES1005: Workshop Practice-I		
Teaching Scheme	**Examination Scheme Semester I (Practical)**	
Practical: 4 Hrs./Week	**ISE I**	**30 Marks**
Credits:02	**ISE II**	**30 Marks**
	ISE III	**40 Marks**
	Total	**100 Marks**

Pre-requisites: Nil

Course Outcomes:

Students will be able to:

	Course Outcomes
CO1	Explain various basic tools and measuring instruments used in workshop trades along with safety practices.
CO2	Operate various measuring instruments and tools used in carpentry, fitting, forging and Sheet metal works.
CO3	Practice hands-on exercises on carpentry, fitting, forging and Sheet metal works trade to improve the knowledge and the skill sets.
CO4	Explain power tools used in Carpentry, Fitting, forging and Sheet Metal works with required safety measures.

Sr. No.	Title of the Experiments
1.	**Introduction:** - Basic tools, measuring instruments used in carpentry, fitting, forging and Sheet metal works. Adaptation of various safety standard practices in workshop.
2.	**Fitting-** Basic tools, power saws, work holding devices, marking tools, measuring tools, cutting tools, finishing tools, various operations, safe work practices, power tools. Performing one Hands-on exercise.
3.	**Carpentry-** Basic tools, work holding devices, marking tools, measuring tools, cutting tools, finishing tools, various operations on wood working lathe, power tools and safe work practices, Performing one Hands-on exercise.
4.	**Forging -** Basic tools and equipments, work holding devices, marking tools, measuring tools, cutting tools, finishing tools, various operations, power tools and safe work practices, Performing one Hands-on exercise
5.	**Sheet metal works -** Basic tools and equipments, work holding devices, marking tools, measuring tools, cutting tools, finishing tools, various operations, safe work practices

Approved in XXIIIrd Academic Council, Dated 23 June 2021

Mapping of Course outcome with Program Outcomes and Program Specific Outcomes for Workshop Practice-I

Course outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1			1							
CO2	3	2			2				1			
CO3	3	2			2				1			
CO4	2				2							

1-Low, 2-Medium, 3-High

EEES1003 : Electrical Workshop		
Teaching Scheme	**Examination Scheme**	
Practical: 4 Hrs/Week	**ISE I**	**50 Marks**
Credits: 2	**ISE II**	**50 Marks**

Course Outcomes:

After completion of this course students will be able to:

	Course Outcomes
CO1	Recognize electrical safety measures
CO2	Use and select various electrical tools, components and measuring instruments
CO3	Identify different types of wires, cables, light sources and switches
CO4	Explain ratings of household electrical appliances, electrical machines
CO5	Describe types of earthing, calculate energy bill

List of the Experiments

The student shall perform minimum Twelve experiments from the following list

Sr. No.	Title of the Experiments	Skill / Knowledge Level	CO
1	Identify different types of cables/wires and switches and their uses.	K2	CO1, CO3
2	Identify different types of fuses & fuse carriers, MCB and ELCB, MCCB with ratings and usage.	K2	CO1,CO2,CO3,
3	Wiring of simple light circuit for controlling light/fan point (PVC conduit wiring).	K2	CO1,CO2,CO3, CO4
4	Wiring of light/fan circuit using Two way switches (Staircase wiring).	K2	CO1,CO2,CO3, CO4
5	Wiring of fluorescent lamps and light sockets.	K2	CO1,CO2,CO3, CO4
6	Wiring of Power circuit for controlling power device	K2	CO1,CO2,CO3, CO4
7	Godown wiring / Tunnel wiring	K2	CO1,CO2,CO3, CO4,CO5
8	Wiring of power distribution arrangement using single phase MCB distribution board with ELCB, Main switch and Energy meter.	K2	CO1,CO2,CO3, CO4
9	Measurement of voltage, current and power in single phase circuit using voltmeter, ammeter and wattmeter.	K2	CO1,CO2,CO3, CO4
10	Calculate the power factor of the circuit.	K2	CO1,CO2,CO3, CO4,CO5

Approved in XXIIIrd Academic Council, Dated 23 June 2021

11	Wiring of backup power supply including inverter, battery and load for domestic installations.	K2	CO1,CO2,CO3, CO4
12	Demonstration and measurement of power consumption of electric iron, mixer grinder, single phase pump, exhaust fan etc.	K2	CO1,CO2,CO3, CO4
13	Demonstration of Motor winding	K2	CO1,CO2,CO3, CO4
14	Demonstration of DO fuses	K2	CO1,CO2,CO3, CO4
15	Visit to 11kV distribution transformer/substation	K2	CO1,CO2,CO3, CO4,CO5
16	Installation and maintenance of domestic solar appliances	K2	CO1,CO2,CO3, CO4,CO5
17	Installation and maintenance of electrical equipments	K2	CO1,CO2,CO3, CO4,CO5
18	Installation of domestic Earthing	K2	CO1,CO2,CO3, CO4,CO5
19	Study of Battery Maintenance	K2	CO1,CO2,CO3, CO4
20	Study of On-OFF control of electrical lighting and fans operated by remote	K2	CO1,CO2,CO3, CO4

Mapping of Course outcome with Program Outcomes and Program Specific Outcomes

Course outcomes	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
CO1	2	1				2	1	1	1	1		
CO2	2	2				2	1	1	1	2		
CO3	3	1				1	2	1	1	1		
CO4	2	2				2	1	1	1	1		
CO5	2	2				2	2	1	1	1		

1-Low, 2-Medium, 3-High

Approved in XXIII[rd] Academic Council, Dated 23 June 2021